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Identifying sensitive marine areas in the South China Sea under international law

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Incroyable! Deux ombres!

Hum! … Deux soleils!

Euh… évidemment, ça explique les deux ombres…

Mais non, mais non! … Qu'est-ce que je raconte? Ça n'explique rien du tout !

(Fred, Philémon, Tome 2 : Le Naufrage du 'A', Dargaud, Paris)

Abstract

At the interface of law, science and policy, this study is centred on the scientific and technical criteria adopted for the identification of sensitive marine and coastal areas, the role of international law and the adequacy of scientific evidence. It uses the South China Sea (SCS) as a case-study the basis that it is (1) a regional sea which is not protected under any binding regional instrument -this makes international law particularly relevant for direct implementation; and (2) a regional sea whose resources are subjected to intense and often competing uses in a politically and ecologically sensitive environment -identification of sensitive marine areas therefore appear opportune. The identification of sensitive area necessarily precedes the choice of and designation of Marine Protected Areas and Area-Based Management Tools (ABMTs). It also precedes the question of the content of states' obligation to protect and preserve the marine environment, which are outside the scope of this study.

This study investigates the legal status of sensitive area criteria adopted under the auspices of intergovernmental processes but in often non-binding instruments and documents. It asks whether and how these sensitive area criteria may contribute to inform implementation of the obligation to protect and preserve the marine environment under international law.

Part 1 extracts a unique reference set of ten ecological and seven non-ecological criteria from the compilation and comparative analysis of 14 sets of scientific and technical criteria adopted by intergovernmental bodies globally and at regional level in Southeast Asia. The analysis of these criteria across the instruments confirms their consistent and mutually reinforcing use.

Part 2 examines first state practice in the use of these criteria for the identification of 94 sensitive marine and coastal areas in Southeast Asia and finds that overlapping identifications confirm the consistent and mutually reinforcing use of ecological criteria. Second, the examination of scientific evidence available for the Spratly seamounts shows that it is sufficient to meet several of the reference set of criteria. The last chapter questions the legal status and role of the technical and scientific criteria. It envisages them as a source of informal law-making, examining their potential normative intent and effect, their congruence, mutual supportiveness, legitimacy and support by state-practice, and their shaping role in the emergence of a global normative web.

The legal strength of sensitive area criteria is considered in the context of the implementation of the United Nation Convention on the Law of the Sea (UNCLOS) and especially Article 194(5), to argue that they may be seen as emerging international standards under UNCLOS -against which to assess the fulfilment by states of their obligation to act with due diligence to protect and preserve the marine environment, including rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.

Acknowledgements

This work marks a milestone in a slow learning journey where I progressively began to unravel the many facets and intricacies of marine international law, the many (segregated!) fields of marine sciences and the theory and “cookery” of policy-making. They showed me the ocean of confusion that still separate them, despite their alleged attempt to link up, and outlined the critical need to keep working on bridging them. Each area of work has its own distinct assumptions and reasoning and all require reconciling for effective law and policy-making purposes. This study is a modest attempt to investigate the critical role of technical scientific guidance to the body of international law and vice-versa.

It has been challenging to weave knowledge from law, policy and science and would not have been possible without the infinite patience, support and push (Are you nearly finished?) from all around me: Terence and our boys, my dear supervisors, colleagues and friends in Singapore and those beyond near seas and far.

Certification

I, Youna LE BERRE LEMAIRE LYONS, declare that this thesis submitted in fulfilment of the requirements for the conferral of the degree of Doctor of Philosophy from the University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

Youna LE BERRE LEMAIRE LYONS

Date : 31 October 2022

List of Common Abbreviations

ABNJ	Areas Beyond National Jurisdiction
ACAP	Agreement on the Conservation of Albatrosses and Petrels
ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Seas, Mediterranean and Contiguous Atlantic Area
AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
APEC	Asia Pacific Economic Cooperation
APEIs	Areas of Particular Environmental Interest
APFIC	Asia-Pacific Fisheries Commission
APM	Associated Protected Measure
ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic, Northeast Atlantic, Irish and North Seas
ASEAN	Association of Southeast Asian Nations
ATBA	Area to be Avoided
BBNJ	Biodiversity Beyond National Jurisdiction
CBD	Convention on Biological Diversity
CCAMLR	Convention for the Conservation of Antarctic Marine Living Resources
CCZ	Clarion Clipperton Zone
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLCS	Commission on the Limits of the Continental Shelf
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COBSEA	Coordinating Body on the Seas of East Asia
COP	Conference of the Parties
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTI	Coral Triangle Initiative
EAAFP	East Asia-Australasian Flyway Partnership
EBSA	Ecologically or Biologically Significant Areas
ECS	Extended Continental Shelf
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EUROBATS	Agreement on the Conservation of European Bats
FAO	Food and Agricultural Organization of the United Nations
GEF	Global Environment Facility
GOBI	Global Ocean Biodiversity Initiative
GPSR	General Provisions on Ships' Routeing
IBA	Important Bird Areas
ICES	International Council for Exploration of the Seas
ICOMOS	International Council on Monuments and Sites
ICRW	International Convention for the Regulation of Whaling
IMMA	Important Marine Mammal Area
IMO	International Maritime Organization
Incl.	Including
IOC or IOC-UNESCO	the Intergovernmental Oceanographic Commission of UNESCO
IOC-WESTPAC	Sub-Commission for the Western Pacific of IOC-UNESCO
IOSEA Marine Turtle MOU	Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia
IPIECA	Global Oil and Gas Industry Association for Environmental and Social Issues, initially the International Petroleum Industry Environmental Conservation Association
ISA	International Seabed Authority
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unreported and Unregulated Fishing

IWC	International Whaling Commission
IWRB	International Waterfowl and Wetlands Research Bureau
KBA	Key Biodiversity Area
km^2	square kilometre
LC or LC 1972	1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
LP or LP 1996	1996 London Protocol to the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
LTC	Legal and Technical Commission of the International Seabed Authority
MAB	UNESCO's Man and the Biosphere Programme
MARPOL	International Convention for the Prevention of Pollution from Ships
MEA	Multilateral Environmental Agreement
MEPC	Marine Environment Protection Committee of the IMO
MIDAS	Managing Impacts of Deep-sea Resource Exploitation
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NA	Not Applicable
NCB	National Conservation and Biodiversity
NCSR	Sub-Committee on Navigation, Communications and Search and Rescue of the IMO
NE	Northeast
NEAFC	North East Atlantic Fisheries Commission
NGO	Non-Governmental Organisation
NM	Nautical Mile
NOWPAP	Northwest Pacific Action Plan
NW	Northwest
OPRC	1990 Convention on Oil Pollution Preparedness, Response and Co-operation
OSPAR Convention	Convention for the Protection of the Marine Environment of the North-East Atlantic
OUV	Outstanding Universal Value
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PNG	Papua New Guinea
RFMO/A	Regional Fisheries Management Organisation or Arrangement
RIS	Ramsar Information Sheet
RSI	Ramsar Site information
SAP	ASEAN Strategic Action Programme
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice to the CBD COP
SCS	South China Sea
SD	Sustainable Development
SDG	Sustainable Development Goal
SEAFDEC	Southeast Asian Fisheries Development Centre
SIDS	Small Island Developing State
SIMSEA	Sustainability Initiative in the Marginal Seas of South and East Asia
SOLAS	International Convention for the Safety of Life at Sea
SPA and Biodiversity Protocol	Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean
SPAMIs	Specially Protected Areas of Mediterranean Interest
SPAW Protocol	Protocol Concerning Specially Protected Areas and Wildlife
SSME	Sulu-Sulawesi Marine Ecoregion
TNC	The Nature Conservancy
UN	United Nations
UNCLOS	1982 United Nations Convention on the Law of the Sea

UNDP	United Nations Development Programme
UNEP or UN Environment	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNGA	United Nations General Assembly
UNICPOLOS	UN Informal Consultative Process on Oceans and Law of the Sea
VME	Vulnerable Marine Ecosystem
VTS	vessel traffic management services
WCMC	World Conservation Monitoring Centre
WCPA	World Commission on Protected Areas
WOW	Wings over Wetlands, the UNEP-GEF African-Eurasian Flyways Project
WWF	World Wide Fund for Nature

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Introduction on the Research Topic and Methodology

This study focuses on international law and prospects for its application to identify sensitive marine areas in the South China Sea (SCS), a regional sea whose resources are subjected to an intense and often conflicting use in a politically and ecologically sensitive environment. This regional sea is concurrently hosting a number of competing features: maritime sovereignty and boundary disputes that create political and security flashpoints; among the highest marine biodiversity in the world; one of the busiest shipping lanes; and high reliance on marine capture fisheries. This difficult situation makes the SCS of particular interest on several dimensions: legal, political and strategic, as well as environmental and scientific.

This study explores in particular the legal and environmental dimensions through an investigation of the prospects for and challenges in the direct application of the international legal framework for the identification and protection of sensitive marine areas: direct application which results from the fact that the SCS is an ocean basin with no regional binding rules for the protection and management of the marine environment. Sensitive areas in the context of this study are marine and coastal areas whose important ecological, economic, social, cultural, educational and/or scientific characteristics may be adversely affected by anthropogenic effects and/or other environmental changes. Legal, ecological and scientific issues encountered in the implementation of international law are investigated, thereby placing this research study at the interface of law, science and policy.

The applicable international legal framework includes the 1982 United Nations Convention on the Law of the Sea (UNCLOS)[1] and the 1992 Convention on Biological Diversity (CBD)[2], along with another 10 international treaties and families of instruments and nine regional treaties and instruments. Twenty-one treaties and families of instruments applicable to sensitive marine areas are compared. Therefore, some of the conclusions could be relevant to

[1] United Nations Convention on the Law of the Sea, 10 December 1982, 1833 U.N.T.S. 3, 21 I.L.M. 1261 (entered into force 16 November 1994) [UNCLOS]

[2] Convention on Biological Diversity, 5 June 1992, 1760 U.N.T.S. 79, 31 I.L.M. 818 (entered into force 29 December 1993) [CBD]

sensitive marine areas in other ocean basins, including in areas beyond national jurisdiction where the international legal framework is directly applicable (subject to specialised agreements such as Regional Fisheries Management Organisations or Arrangements (RFMO/As) and related agreements).

After the presentation of the context and background of this study, the introduction sets out the objectives of the study, followed by an outline of the research questions, the methodology and the structure of the study. Finally, it discusses the scope of this study, especially with respect to the difference between the concept of sensitive marine areas explored in this study – often coined in the international policy discourse as Area-Based Management Tool (ABMT) – and the concept of Marine Protected Area (MPA).

1 Background and context

1.1 Legal governance framework

The governance regime of the marine environment in the seas of Southeast Asia can be contrasted with that of other regions of the world where coastal states have entered into binding regional seas agreements to manage the marine environment.

Different regional seas are at different stages of development of an institutional and legal framework to manage their marine environment. Among the most legally developed regional governance frameworks are those of the North-East Atlantic under the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention)[3] and of the Mediterranean Sea under the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention).[4] Both regional governance frameworks include a framework convention which provides for

[3] 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic, 22 September 1992 (entered into force 25 March 1998) 2354 UNTS 67 [OSPAR Convention]

[4] Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (adopted on 16 February 1976, entered into force on 2 December 1978, was amended and renamed on 10 June 1995) 1102 UNTS 27 (Barcelona Convention).

State parties' obligations with respect to the protection of the marine environment and is completed by annexes or protocols on specific issues such as pollution by dumping, offshore activities, and the protection and conservation of biodiversity and sensitive marine areas. These framework conventions also established institutions vested with the decision power to administer and implement the regional convention and their annexes and/or protocols.[5]

Although most littoral States of most transboundary semi-enclosed and enclosed seas have now adopted a binding convention, those of the seas of Southeast Asia have not.[6] However, coastal states in Southeast Asia have developed an action plan, a non-binding instrument described by the Regional Seas Programme of the United Nations Environment Programme (UNEP)[7] as the first step in the process of establishing a regional programme aimed at the protection of the common body of water.[8] This approach fits better with the preferred ASEAN approach of the Association of the Southeast Asian Nations (ASEAN) or 'ASEAN Way' focused on regional cooperative mechanisms to implement international instruments on

[5] The OSPAR Convention has five technical Annexes: on pollution from land-based sources (I), pollution by dumping or incineration (II), pollution from offshore sources (III), quality of the marine environment (IV) and ecosystems and biological diversity of the maritime area (V); the governing body for the administration and implementation of the Convention and its Annexes is the OSPAR Commission established by the Convention with a large mandate. Decisions of the OSPAR Commission are binding on the Contracting Parties according to Article 13(2) of the Convention. The Barcelona Convention establishes a different decision-making framework for the management of the marine environment tin the Mediterranean Sea where the decision-making body is the Conference of the Parties to the Barcelona Convention. The Convention has been completed with seven Protocols addressing specific aspects of the Mediterranean marine environment: dumping, pollution from ships and emergency situations, land-based pollution, especially protected areas biological diversity, pollution from offshore activities, pollution from hazardous waste, and Integrated Coastal Zone Management. Available https://www.ospar.org/convention/text and http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/index_en.htm; accessed 15 Mar 2022

[6] Of the 19 regional seas programmes listed by UN Environment, 16 have adopted a convention, are in the process of adopting it or are negotiating one. The only regional seas programmes with an action plan without a convention are: The East Asian Seas, the South Asian Seas and Northwest Pacific. Available https://www.unep.org/explore-topics/oceans-seas/what-we-do/regional-seas-programme; accessed 15 Mar 2022

[7] The United Nations Environmental Programme or UNEP has also been referred at times as UN Environment.

[8] UN Environment website-page on Regional seas action plans. Available https://www.unep.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/regional-seas-action-plans; accessed 18 Mar 2022

environmental protection.[9]

Another important feature of the ASEAN approach is that it is rule-based. The preamble of the ASEAN Charter and Article 2(2) clearly state the adherence of member States to 'the rule of law and good governance'. Article 2(2)(j) also includes the commitment to uphold

> the United Nations Charter and international law (…) subscribed to by ASEAN Member States.[10]

This commitment is further reiterated in ASEAN soft law instruments which consistently refer back to international and regional instruments of hard and soft law that are considered to be the most relevant to the subject matter of the instrument. Most instruments that relate to the protection and management of the marine environment contain such a reference.[11]

The States of Southeast Asian[12] indeed recognise the importance to protect and preserve the marine environment and they have independently adopted most international instruments on marine environmental protection.[13]

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[9] The ASEAN Way can be described as aiming 'to build cooperation across the member States incrementally, and by consensus' so that 'this body of state practice grows incrementally, and the legal analysis may be useful over a longer time period'. It can be also seen as an approach focused on non-interference with or in other states' sovereignty. KL Koh and NA Robinson (2002) Strengthening sustainable development in regional intergovernmental governance: lessons from the 'ASEAN Way', Singapore Journal of International and Comparative Law, 6:640-682 and KL Koh and NA Robinson (2016) ASEAN Environmental Legal Integration: Sustainable Goals?, Cambridge University Press, 2016

[10] 2007 Charter of the Association of Southeast Asian Nations. Available https://asean.org/wp-content/uploads/images/archive/publications/ASEAN-Charter.pdf; accessed 18 Mar 2022

[11] Examples include the Chairman's Statement of the 34th ASEAN Summit which refers twice to relevant international law and instruments, the 2019 ASEAN Leaders' Vision Statement on Partnership for Sustainability which specifically refers to UNCLOS (as do many other ASEAN instruments) and implementation of international law in the context of IUU fishing; and, many issue-specific instruments applicable to the marine environment which refer to UNCLOS as well as MARPOL, the CBD, UNFCCC, the Basel Convention and many others of the international legal framework. Respectively available https://asean.org/asean2020/wp-content/uploads/2021/01/Final_Chairs-Statement-of-the-34th-ASEAN-Summit-rev.pdf; https://asean.org/asean-leaders-vision-statement-on-partnership-for-sustainability/; and as an example of an issue specific instrument on marine debris https://asean.org/bangkok-declaration-on-combating-marine-debris-in-asean-region/; accessed 18 Mar 2022

[12] For instance, the 2003 Putrajaya Declaration of Regional Cooperation for the Sustainable Development of the Seas of East Asia, http://www.pemsea.org/sites/default/files/putrajaya-declaration.pdf; accessed 31 Oct 2022

[13] These include Annexes 1, 2 and 5 of the 1973/1978 Convention on Marine Pollution by Ships, the 1971 Convention on Wetlands of International Importance, the 1972 Convention concerning the World Cultural and Natural Heritage, the 2001 Memorandum of Understanding (MoU) on the conservation of marine petrels, the 2007 MOU on the conservation of dugongs, as well as the key UNCLOS and the CBD. See the Introduction to Part 1 for the full reference of all these instruments.

Furthermore, despite the absence of a binding regional instrument at regional level, coastal states have contributed to the establishment of several regional bodies, working groups and programmes focused on different aspects or subsets of the marine environments. These include bodies and working groups established by the ASEAN,[14] in close working relationship with the ASEAN,[15] created under the auspices of agencies of the United Nations,[16] and/or established under other conventions. (Figure 1)[17]

[14] The ASEAN has 10 Member States: Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. All except Laos (landlocked) and Myanmar (along the Andaman Sea) are littoral States of the SCS and the Gulf of Thailand. At least eight ASEAN working groups are under each of the three pillars and three centres, including the ASEAN Centre for Biodiversity and the ASEAN Centre for Energy (see Figure 1).

[15] Working groups in close working relationship with the ASEAN are those established out of the network of dialogue partnership engaged by the ASEAN with other countries such as the ASEAN + China and the ASEAN +17. Another important related body is the Southeast Asia Fisheries Development Centre (SEAFDEC) established by ASEAN States and Japan. The ASEAN Sectoral Working Group on Fisheries (AWGFi) partnered with SEAFDEC under the ASEAN-SEAFDEC Strategic Partnership (ASSP). Through this ASSP, ASEAN produced several policy frameworks, including ASEAN fisheries policies, and adopted ASEAN fisheries guidelines (see Figure 1).

[16] These include regional bodies and their intergovernmental meetings, such as the Coordinating Body on the Seas of East Asia (COBSEA) – secretariat of UN Environment's Regional Sea Programme (RSP) for East Asia-, the International Oceanographic Commission Sub-commission for the Western Pacific (IOC-WESTPAC) - an intergovernmental scientific organisation established under the IOC of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Asia-Pacific Fishery Commission (APFIC) - a Regional Fisheries Body under the United Nations Food and Agriculture Organization (FAO) that covers fisheries, aquaculture and related aquatic resource issues in the Asia-Pacific region.

[17] Although it originated out of two regional projects implemented by the IMO and United Nations Development Programme (UNDP) under the GEF Trust Fund, the Partnership in Environmental Management for the Seas of East Asia (PEMSEA) is an intergovernmental organisation. However, of the SCS littoral States, Brunei, China and Malaysia are not PEMSEA members. Other bodies established under other conventions or programmes include the meeting of parties to the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and Southeast Asia (IOSEA Marine Turtle MOU). Also of critical importance in the region is the development of the Coral Triangle Initiative, its coordination meetings and working groups. See infra note 824

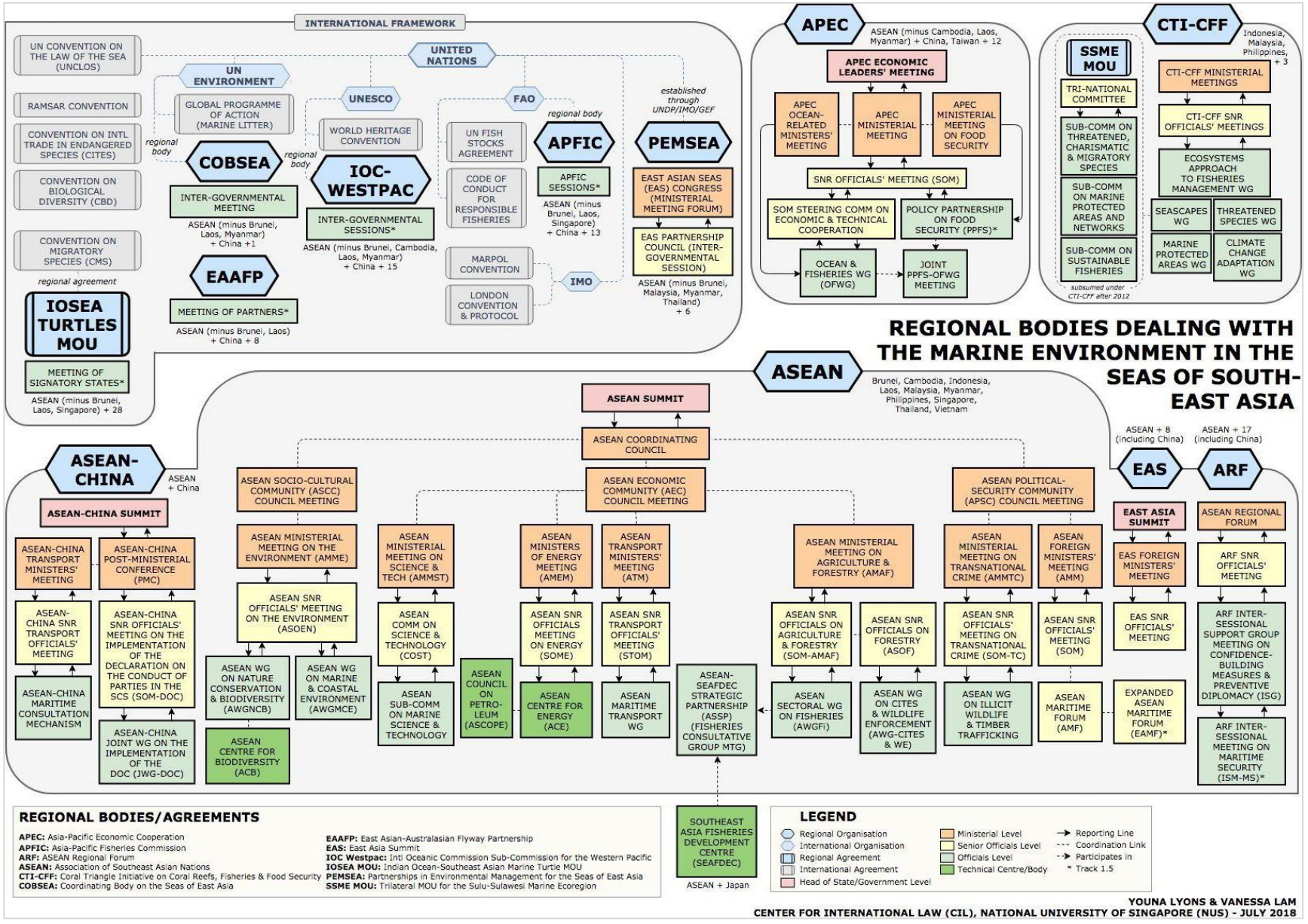

Figure 1: Regional bodies relevant to the protection of the marine environment in Southeast Asia

The regional legal framework for the protection of the marine environment –which is mostly composed of the applicable international legal framework– can be described as fragmented because it is composed of numerous and distinct treaties and bodies of norms of international marine environmental law.[18] In the context of the protection of sensitive marine areas, several treaties that apply to the marine environment focus on different types of sensitive marine areas. Examples of such different types of sensitive areas include areas that are sensitive because they host marine biodiversity with specific characteristics, wetlands of international importance and endangered migratory species.

This study investigates these different types of sensitive marine areas to explore whether their application (i) simplified and streamlined, although they use different terminology, (ii) applied together, despite their emanation from different treaties; and (iii) implemented without the necessity of an additional and binding regional instrument.

1.2 Politically and strategically (Figure 2)

The seas of Southeast Asia are responsible for possibly close to 30% of the world marine capture production;[19] one-third of the world's maritime trade by volume passes through the region, as does half of the world's supertanker traffic,[20] and the product of a growing oil and gas extractive industry; they are also responsible for 40% of the GDP of the less developed

[18] The International Law Commission characterises the phenomenon of legal fragmentation in international law as the result of 'the emergence of specialised and (relatively) autonomous rules or rule complexes, legal institutions and spheres of legal practices'; ILC, Fragmentation of International Law: Difficulties arising from the diversification and expansion of international law, UN Doc A/CN.4/L.682 (13 April 2006) 11 [8] ('Fragmentation of international law'). Scott further considers that this fragmentation emphasises the isolation and disconnection between regimes and institutions; KN Scott (2011) International environmental governance: managing fragmentation through institutional connection, Melbourne Journal of International Law 12: 177-216 [178]

[19] The total marine production is increasing year on year as the global production is stagnating, resulting in a proportional increase of the importance of the region. SEAFDEC (2018) Fishery Statistical Bulletin of Southeast Asia 2016, SEC/ST/51-Bangkok, Thailand; FAO (2020) The State of the World Fisheries and Aquaculture – Meeting the sustainable development goals, Rome, Italy. Available https://www.fao.org/documents/card/fr/c/I9540EN/; accessed 18 Mar 2022. To note, these figures do include production from inland capture fisheries and aquaculture.

[20] 80% of the crude oil supplies for Japan, South Korea and Taiwan flow through the SCS from the Middle East, Africa and other coastal states of the SCS. (DG Wiencek (2002) Energy issues in the SCS Region, in Cooperative monitoring in the SCS, JC Baker and DG Wiencek (eds.)) 90% of the world's trade is estimated to be carried on ships. (Opening session welcome address H.E. Dr Lam Pin Min Minister for Transport at the Opening Ceremony of the International Safety @Sea Conference 2018). Available https://www.mot.gov.sg/news-centre/news/Detail/opening-remarks-by-senior-minister-of-state-for-transport-dr-lam-pin-min-at-the-opening-ceremony-of-the-international-safetysea-conference-2018; accessed 18 Mar 2022

economies of the region.[21] The current growth in both the intensity and diversification in types of maritime and marine activities in the SCS (both in range of activities and in intensity of use of the oceans) further increases the pressure exerted on it. A forecast issued prior to the Covid19 crisis included an increase in offshore oil and gas production in the SCS and in import and export of oil and gas due to the increased demand in hydrocarbons fuelled by development. However, the International Energy Agency, which, in 2018, predicted a quintupling in net oil import into China by 2023, implying substantially increased tanker traffic in the future, now envisages alternative scenarios. The specific impact of alternative scenarios on the marine environment is still unclear.

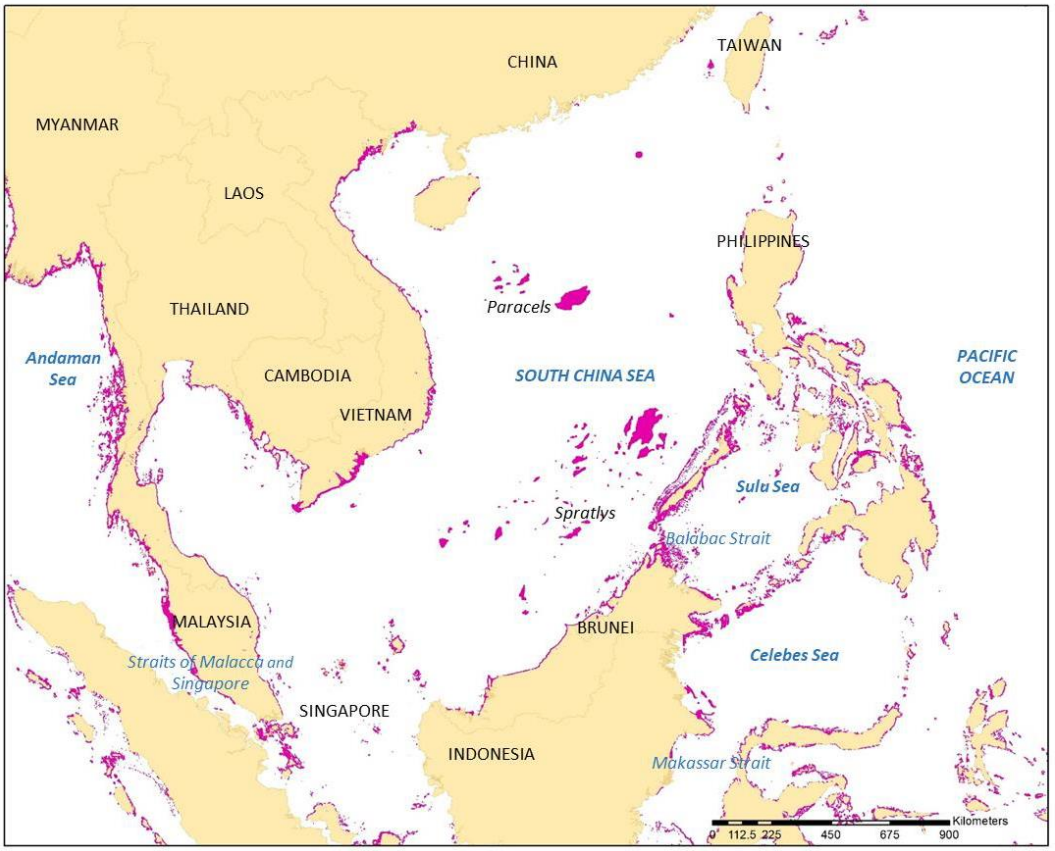

Figure 2: South China Sea including shallow reefs (in pink) that are visible on satellite imagery (<20m deep)

[21] UNEP/COBSEA (2009) State of the marine environment report for the East Asian Seas, Chou Loke Ming (ed.), COBSEA Secretariat Bangkok, UNEP

Marine capture fisheries in the SCS have also been increasing. Marine capture fisheries in Southeast Asia as a percentage of global marine fisheries capture production rose to 18.4% in 2014. Over 10% of the global production in 2014 came from the SCS alone: down from 11.08% in 2012.[22] It appears that the overall productivity in quantity is stagnating as the increase in declared catch may be attributed to a decrease in unreported catches.[23] Additionally, the marine capture fisheries by the littoral states of Southeast Asia also supports the development of aquaculture which has been significantly raising, by providing feeds.

The high level of production in volume, as acknowledged in FAO reports and specialized publications, hides a decrease in the average size of fish and a change in the composition of species being caught due to an overfishing process known as 'fishing down the food web'; whereby the larger fish and certain fish species are overfished.[24] In addition to overcapacity, a major issues also highlighted a general lack of stock assessments on which to base fisheries management decisions and Illegal, Unreported and Unregulated (IUU) Fishing. The importance of fisheries to the livelihood (inclusive of food and lodging) of the region and therefore to regional food security adds to the sensitivity of this resource, showing that it could create threats to maritime security and stability in the SCS.[25] This risk increases with the deployment of fishing-militia boats for fishing boats operating in areas that are subject to maritime disputes.[26]

Finally, climate change is another stressor projected to compound the pressures on natural resources and the environment,[27] with the risk of hitting tipping points,[28] especially with respect

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[22] FAO (2020) and SEAFDEC (2018), supra note 19 and data from the Sea around of Us Project, extracted from http://www.seaaroundus.org/data/#/lme/36?chart=catch-chart&dimension=reporting-status&measure=tonnage&limit=20; 18 Mar 2022

[23] Ibid. See also D Pauly and C Liang (2020) The Fisheries of the South China Sea: Major Trends since 1950, Marine Policy 121: 103584

[24] FAO (2018) [12], supra note 19. See also LST Teh et al (2016) What is at stake? Status and threats to SCS marine fisheries, Ambio online – DOI 10.1007/s13280-016-0819-0 and M Carmen et al (2005) Exclusive economic zones and the management of fisheries in the SCS, in the exclusive economic zone and governance institutions for living marine resources, SA Ebbin et al (eds.): 136-149

[25] H Zhang (2018) Fisheries cooperation in the SCS: Evaluating the options, Marine Policy 89: 67-76

[26] H Zhang and S Bateman (2017) Fishing militia, the securitization of fishery and the SCS dispute, Contemporary Southeast Asia 39: 288-314

[27] Climate Change 2007: Synthesis report, Cambridge University Press, Cambridge, UK [p50]

[28] RT Paine et al (1998) Compounded perturbations yield ecological surprises, Ecosystems 1:535-545

to coral reefs and mangroves.[29] Over 34% of the coral reefs of Asia were already reported to have been lost in 1998, largely due to coral bleaching induced by the 1997/1998 El Niño event.[30] Sea-level rise is also expected to adversely affect reef systems.[31] This additional stressor on marine habitats can have particularly serious impacts on Southeast Asia due to the connectivity of the Spratly Reefs with coastal reefs in the SCS (see the ecological discussion below) and the high reliance of coastal populations on the marine environment for livelihood.[32] The exposure and vulnerability to climate change processes of different marine areas in the SCS therefore need particular attention; those of particular exposure and vulnerability or those that may offer a refuge against climate change effects to protect species or ecosystems at risk will be considered in this study as potential candidates for identification as sensitive marine areas in the SCS under international law.

However, the political sensitivity of the SCS resulting from the sovereignty and maritime boundary disputes has made cooperation generally difficult, especially with respect to the protection of offshore coral reefs and fisheries.[33] This situation was a particular difficulty that UNEP had to overcome in the late 1990s in the context of the SCS Project, an intergovernmental project funded by the Global Environment Facility (GEF) under the long title of 'Reversing environmental degradation trends in the SCS and the Gulf of Thailand'. Following closure of the project in 2009, several reports were published by members of the coordinating unit for and participants in the project.[34]

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[29] RV Cruz et al (2007) Asia. Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change; ML Parry et al, Cambridge University Press, Cambridge, UK P.472, para.10.1.2. Of note are the repercussions on fisheries from loss of coral reefs and mangroves.

[30] C Wilkinson (ed) (2000) Status of coral reefs of the world: 2000, Australian Institute of Marine Science, Townsville and L Burke, L Selig and M Spalding (2002) Reefs at risk in Southeast Asia, World Resource Institute, accessible on Reefbase. Available http://www.reefbase.org/resource_center/publication/main.aspx?refid=12496; accessed 18 Mar 2022 and L Burke, L Selig and M Spalding (2011) Reefs at risk revisited: Southeast Asia. Available https://pdf.wri.org/reefs_at_risk_revisited.pdf; accessed 18 Mar 2022

[31] JW McManus (2017) Offshore coral reef damage, overfishing and paths to peace in the SCS, The International Journal of Marine and Coastal Law 32: 199-237. See also JF Bruno and ER Selig (2007) Regional decline of coral cover in the Indo-Pacific: timing, extent and subregional comparisons, PLoS ONE 8: e711 and R Cai et al (2017) Response and adaptation to climate change in the SCS and Coral Sea, in Climate change adaptation in Pacific Countries – Fostering resilience and improving quality of life, WL Filho (ed.), Springer

[32] LSL Teh et al (2016), supra note 24 and H Zhang (2018) Fisheries cooperation in the SCS: Evaluating the options, Marine Policy 89: 67-76 [68]

[33] Islands and reefs in the Spratly area and in the Paracel area are the subject of sovereignty disputes between littoral States of the SCS. Different islands are claimed by China, Malaysia, Philippines, Taiwan and Vietnam. Islands in the Paracel area are claimed by China and Vietnam only. These sovereignty claims result in additional maritime boundary disputes between the maritime zones claimed from these features by different claimants and the coastal state's opposite them. R Beckman (2013) The UN Convention on the Law of the Sea and the Maritime Disputes in the SCS, The American Journal of International Law 107: 142-163; L Reed and K Wong (2016) Marine entitlements in the SCS: the arbitration between the Philippines and China, The American Journal of International Law 110: 746-760 and more generally S Jayakumar et al (eds.), The SCS Arbitration: the legal dimension, 2018, Edward Elgar Publishing, Cheltenham Northampton

These reports highlight the efforts made by UNEP to ensure the participation of the seven coastal states which could benefit from GEF funding: China and six ASEAN countries -Cambodia, Indonesia, Malaysia, Philippines, Thailand and Vietnam.[35] To retain China's participation, the project did not cover 'the salient controversial SCS islets waters in their vicinity', 'the issue of coral reefs' and 'the issue of multilateral fishery cooperation'.[36] However, since the mid-2010s, China and Vietnam have engaged in substantial island building and/or anti-erosion work on many of the features they occupied, damaging substantial areas of coral reef flats in the Spratly area in the process.[37]

Given the importance and sensitivity of the SCS, it is particularly relevant to explore how the existing legal and institutional framework may be utilised to support improving cooperation and protection of the marine environment around offshore features in the SCS.

1.3 Ecologically and scientifically

The selection of the SCS and the Spratly seamounts as the case study for this research study is motivated by the ecological significance of the Spratly seamounts for Southeast Asia, a topic often overshadowed by the political sensitivity of this area. The SCS is part of the seas of Southeast Asia, called by marine ecologists 'the global apogee of marine biodiversity'[38]or the 'centre of biodiversity of the World'[39] and the subject of much interest for their exceptional

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[34] Special Issue in volume 85 of the Journal of Ocean and Coastal Management (2013) The SCS project: a multilateral marine and coastal area management initiative. See for example, JC Pernetta and JM Bewers (2013) Introduction to the special issue of coastal and ocean management entitled the SCS project: a multilateral marine and coastal initiative, Ocean and Coastal Management 85: 127-130

[35] Brunei and Singapore were not eligible

[36] S Chen (2013) Environmental cooperation in the SCS: factors, actors and mechanisms, Ocean and Coastal Management 85: 131-140

[37] McManus calculated that 10% of the shallow reefs would have been damaged. JW McManus (2017) supra note 31

[38] KE Carpenter et al (2011) Comparative phylogeography of the Coral Triangle and implications for marine management, Journal of Marine Biology 2011:1-14 [1]

[39] C Wilkinson et al (2006) Strategies to reverse the decline in valuable and diverse coral reefs, mangroves and fisheries: the bottom of the J-Curve in Southeast Asia? Ocean and Coastal Management 49:766-779 [766]

biodiversity.[40] Although the areas of greatest marine biodiversity in Southeast Asia have long been considered to be located in the Sulu-Sulawesi Sea, Java Sea and in the southwestern Pacific Ocean towards Papua New Guinea and the Solomon Islands,[41] a recent study has highlighted the exceptional coral diversity of the SCS. It is possibly comparable with the Coral Triangle and certainly greater than what is generally thought.[42]

As supports for oceanic reef formations in the deeper part of the SCS basin, between 5°N and 12°N, the Spratly seamounts have a unique location as stepping-stones between coastal reefs in different parts of the SCS basin, as well as with those of the Coral Triangle. This finding results from research on the transport of coral larvae between these different areas and studies of population genetic structure and of evolutionary diversity in the SCS and in the surrounding bodies of water. [43] Dorman et al (2015) show that the reefs of the Spratly area may be a significant source of larvae from certain coral reef species for the Palawan reefs and some of the most isolated reefs of the SCS.[44] Huang et al (2016) also show that species that are rare in the SCS tend to be less widespread at the global level, so that their conservation is particularly important.[45] Based on the connectivity studies mentioned before, the Spratly area is of particular significance to the conservation of these corals.

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[40] Depending on the geographical scope of studies, they host from 34 to 44% of the area of world coral reef and a quarter to 40% of the total area of global mangrove area. See P Todd, X Ong and LM Chou (2010) Impacts of pollution on marine life in Southeast Asia, Biodiversity Conservation 19: 1063-1082 [1064] and C Wilkinson et al (2006), ibid [766]

[41] JEN Veron et al (2011) The Coral Triangle, in Coral reefs: an ecosystem in transition, Z Dubinsky and N Stambler (eds.), Springer, Netherlands

[42] D Huang et al (2015) Extraordinary diversity of reef corals in the SCS, Marine Biodiversity 45: 157-168

[43] J Kool et al (2011) Connectivity and the development of population genetic structure in Indo-West Pacific coral reef communities, Global Ecology and Biogeography 20: 695-706. JG Dorman et al (2015) Modeled connectivity of *Acropora millepora* populations from reefs of the Spratly Islands and the greater SCS, Coral Reefs, doi:10.1007/s00338-015-1354-3. This is also consistent with the affinity found by Veron et al between the corals of the SCS and those of the Coral Triangle. JEN Veron et al (2015) Overview of distribution patterns of zooxanthellate Scleractinia, Frontiers in Marine Science 1: Article 81

[44] Dorman (2015), ibid

[45] Huang et al also insist on the potential risk of extinction of some reefs and their importance to biological diversity (especially in western Malaysia, southern China and Paracel area) due to their contribution to rarity and evolutionary diversity. Huang et al (2016) Conservation of reef corals in the SCS based on species and evolutionary diversity, Biodiversity Conservation 25: 331-344

2 Central and subsidiary research questions and objectives

This research is centred on one question: To what extent does international law guide and can further guide the identification of sensitive marine areas in the SCS, and therefore also guide the protection of these areas? How are technical and scientific criteria and/or guidance developed in this context to bridge law and science and implement international law? What is their status?

This question can be divided into the following two main lines of enquiry and their respective sub-questions:

1. How are sensitive marine areas defined under international law and in particular, what are the criteria adopted under international law to identify sensitive marine areas?
   - What are the legal criteria that characterize sensitive marine areas under international treaties and subsidiary documents applicable to the littoral states in the SCS?
   - Are the rules and criteria created under different regimes competing? Can all the criteria be grouped under a unique theoretical set of criteria that encompass them all in order the streamline the application of the many suites of criteria to any new candidate area?
   - How would such a theoretical set of international criteria compare with regional applications under other regional seas regimes for the protection of sensitive marine areas?

2. What could be the result of the application of this theoretical set of criteria to the SCS? What are the prospects for its application? What is the significance of this analysis beyond the SCS?
   - What sensitive areas have been identified under international law in the SCS and contiguous sea basins?
   - Have the same areas been identified under different legal instruments? If so, how similar or different were the criteria based on how different identifications have been made?
   - How do the results from the previous question compare with current state practice? What instruments tend to be used the most for the same area?
   - Could the Spratly seamounts meet the criteria for sensitive marine areas under applicable instruments? How are the available data meeting the criteria?
   - What is the legal status of the technical and scientific criteria considered as a whole? Can they be seen as normative?
   - What could be the prospect for such future application of these criteria in the context of the SCS?

- What are the significance and legal status of the various suites of criteria adopted by intergovernmental bodies in the context of binding instruments? Can they support the implementation of UNCLOS in the SCS and beyond?

The author decided to focus on the identification and definition of sensitive marine areas under international law rather than on the content of states' obligations to protect and preserve such areas and the fulfilment by states of these obligations. The content of states' obligation to protect and preserve the marine environment under international law is the subject of great interest to legal scholars, whereas the legal assessment of the criteria for the identification of sensitive marine areas is not, or at least not yet.

3 Research questions and methodology

A variety of methodologies was adopted to conduct this study, due to its multidisciplinary nature which investigates (1) legal theory and rules of international law, (2) marine scientific evidence, and (3) application of the latter for marine policy-making, consistent with international law. Each of these areas is a broad field of research with its own sets of methodologies, the third area being the most applied as it links the first and second traditional academic disciplines. The broad methodologies used for different types of investigation are introduced below. However, specific details of the methodology are set-out at the beginning of each chapter, in the context of the research question(s).

Questions related to the content of international law relied on traditional legal research techniques. However, they were approached with the entire set of enquiries in mind, including the final but critical question of the legal value of scientific and technical criteria adopted in non-binding instruments adopted by intergovernmental processes. A positivist approach is taken for this purpose, although the formalist approach is also considered. The interactional theory of international law is relied on to assess the persuasive and possibly normative role played by documents that would be considered as *a priori* 'non-legal' under a formalist approach. This involved consideration of the literature on informal law-making, the process by which non-binding rules of law or soft law are progressively taking into account within the body of international law. [46]

[46] See Chapter 6 Section 6.1.1.1 for all details on this methodological approach and supporting references

[47] See D Watkins and M Burton (2017) Research Methods in Law, 2nd Edition, Routledge, London, especially Chapter 1 on Doctrinal Research and Chapter 2 on Socio-Legal Studies; S Ratner and AM Slaughter (2004) The Methods of International Law, Studies in International Policy, The American Society of International LawR Deplano; and N Tsagourias (2021) Research Methods in International Law: A Handbook, Edward Elgar Publishing, especially Chapter 4 on International Legal Method and Chapter 20 From Interdisciplinary to x-disciplinary Methodology of International Law

Two other essential features of the methodological approach taken need highlighting here. First, in order to apply the interactional theory of international law and analyse the development of the sets of criteria in their respective intergovernmental context, the historical development of each set of scientific and technical criteria, its context and evolution are examined first, within their respective legal regime. This vertical (and siloed) approach may appear austere but it is a necessary step before conducting the horizontal cross-analysis in the following chapters. Second, although the potential application of UNCLOS to the findings of the analysis of scientific and technical criteria and criteria sets, underpins this study and its purpose, the discussion of the application of UNCLOS can only take place after the analysis has been completed, thereby arriving in Chapter 6.

Several legal techniques were used overall to conduct this legal analysis according to the above theories. A doctrinal research approach which favours a 'black-letter approach' were used to analyse treaty obligations. The treaty obligations were also assessed in the context of their historical development, customary international law and non-binding obligations and soft law.[47]

Regional governance regimes that are not applicable in the SCS were also consulted as best practice examples: for instance, those of the Mediterranean Sea and the Northeast Atlantic. "Grey" literature was also reviewed and discussed: for example, proposals developed more recently to manage biodiversity beyond national jurisdiction and reports from international organizations or non-governmental organizations. The analysis of non-binding provisions of international law, soft law and other political documents adopted by governments also involved complementary methods of enquiry preferred by international relations studies to shed light on the institutional context and processes in which the provision were developed and to analyse their level of acceptance and their legal significance.[48]

The comparative analyses conducted between legal regimes and different sets of criteria adopted under the auspices of different families of instruments relied on a mixed qualitative and quantitative analysis based on a detailed analytical framework applied systematically

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[48] See Jean d'Aspremont (2021) International Legal Methods: Working for a Tragic and Cynical Routine: 42-59, in Deplano and Tsagourias, ibid

[49] J Ritchie and J Lewis, Qualitative Research Practice: A Guide for Social Science Students and Researchers, 2003, Sage, London [pp40-43]. See also NK Gale et al (2013) Using the Framework Method for the analysis of Qualitative Data in Multi-Disciplinary Health Research, BMC Medical Research Methodology 13: 117-124

[50] Gale et al (2013), ibid

[51] See O Korhonen (2021) From interdisciplinary to x-disciplinary methodology of international law: 345-365, in Deplano and Tsagourias, supra note 48

and rigorously across the regimes and systems being compared. The qualitative analysis framework used to compare criteria from different instruments and to determine the extent to which they overlap uses a framework method and forms the basis for the design of a reference framework of criteria for comparison purposes.[49] A quantitative analysis is then used to compare the use of different criteria by different types of sensitive areas, in theory and in practice, in Southeast Asia. Excel tables and graphs (bar graph and radar charts) display multivariate data in the form of two- or three-dimensional charts of two or three quantitative variables.[50] Methods, analysis and findings developed are fully documented and are available, in annexes and online, so as to be verifiable and repeatable.[51]

Investigations of available scientific data on sensitive areas (including sensitive species and habitats) have been desktop-based, using a descriptive research approach based on primarily peer-reviewed articles and proceedings from regional conferences focused on the marine environment in the SCS. This first assessment of facts is designed to establish them prior to analysing them to apply the criteria in a rigorous deductive approach and determine whether they are met.[52] The discussion of the potential application of the different instruments and sets of criteria to the Spratly area relies on a case-study methodology that is an empirical mixed-method enquiry.[53]

Finally, sensitive marine areas identified and/or designated in the SCS under international or regional instruments were mapped using Geographic Information System (GIS) data available through ArcGIS 10. The approach adopted for each key research question and some key sources is further detailed below.

4 Structure of the study

The study is structured in two parts; each investigates the lines of enquiry described above.

Part 1 – Definition and identification of sensitive marine areas under international law

This first part is a foundational component of this study. It sets the basis for the discussion in Part 2.

[52] Worster provides a detailed description of the deductive reasoning method which begins with premises, which, if true, must lead to a true conclusion. WT Worster (2013) The Inductive and Deductive Methods in Customary International Law Analysis: Traditional and Modern Approaches, Georgetown Journal of International Law: 445-521

[53] This is a case-study, or case example, approach. Case-studies are empirical mixed-method enquiries that examine contemporary social and political phenomena and explore the actions of actors in the policy process and capture the dynamics of real life. R Yin (2003), Case Study Research: Design and Methods, 3rd Edition, London Sage Publications. See also Worster (2013) ibid

The answer to the central question -how are sensitive marine areas defined under international law and in particular what criteria were adopted under international law to identify sensitive marine areas-, is divided into 3 chapters:

Chapter 1 investigates scientific criteria developed to identify sensitive areas in instruments focused primarily on the conservation of components of the marine environment (wetlands and biodiversity areas, for example) and adopted at international or regional level;

Chapter 2 investigates scientific criteria developed to identify sensitive areas in another category of instruments, whose primary purpose is to regulate activities at sea whilst minimizing impacts on the marine environment;

Chapter 3 compares all the sets of criteria reviewed in Chapters 1 and 2 and proposes a theoretical set of criteria that encompasses all existing criteria under international law. In order to test its robustness, this theoretical set is compared with criteria adopted under other regional seas regimes for the protection of sensitive marine areas, including the North Atlantic and the Mediterranean Sea.

Although the United Nations Framework Convention on Climate Change (UNFCCC) and the 2015 Paris Agreement[54] are not included in Chapters 1 and 2 because they do not include provisions for the identification of sensitive marine areas and decisions adopted by the COPs do not either, climate change effects are fortunately referred to in the context of the implementation of several other instruments, including the CBD. Adverse effects of climate change on marine ecosystems and the consideration of these effects as a criterion to identify sensitive areas are examined in Chapter 3 Section 3.1.11.

The study of sensitive areas under different international and regional instruments in Chapters 1 and 2 uses the same analytical framework for each instrument or group of instruments focused on:

- the main purpose of the relevant instrument(s) and their legal status;
- the geographical scope of the instrument(s) and their status of adoption by littoral states of the SCS;
- the criteria adopted to identify sensitive areas and their legal status;
- the listing procedure for each category of sensitive area and its current status in identification or designation of sensitive areas, especially in the context of the SCS,

[54] United Nations Framework Convention on Climate Change, 9 May 1992, 1771 U.N.T.S. 107 (entered into force 21 March 1994) [UNFCCC] and the Paris Agreement, 12 December 2015, 3156 U.N.T.S. (entered into force 4 November 2016) [Paris Agreement). Although it is only early days for the development of the Climate-Ocean Nexus, the adoption of criteria for the identification of sinks and reservoirs of carbon dioxide (UNFCCC Articles 3(3) and 4(b) and (c)) in the context of the marine environment may be adopted in the future, in the context of the momentum created for the protection of blue carbon and the scientific research undertaken under the Blue Carbon Initiative. Available https://www.conservation.org/projects/blue-carbon; accessed 28 Nov 2022. See also Chapter 3 Section 3.1.11 and note 704

or Southeast Asia if few such identifications or designations have been made in the SCS;

- obligations expected from states with respect to such sensitive areas under each instrument and the activities which may be restricted within these areas, if any;
- the reporting, monitoring and review process for these sensitive areas.

The different concepts of 'sensitive' areas examined in Chapters 1 and 2 were conceived for different purposes and by different institutions charged with different aspects or uses in the marine environment: the CBD and its Conference of the Parties (COP), COP to the 1972 London Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matters (London Convention), and its 1996 Protocol (1996 Protocol) for dumping, Marine Environmental Protection Committee (MEPC) of the IMO, FAO, COP to the 1971 Ramsar Convention on the Protection of Wetlands of International Importance especially as Waterfowl Habitat,[55] among others. However, a coastal state faced with the implementation of these concepts of 'sensitive' areas must find a way to implement them all concurrently. For that purpose, these different notions of 'sensitive areas' and their potential interplay must be explored to determine a clear understanding of situations in which they may be competing or overlapping. This is the purpose of Chapter 3's comparative analysis of the different sets of criteria.

Part 2 – Application of the criteria to Southeast Asia and analysis at the interface of law and science

This part is divided into three chapters. The first two are focused on the application of these criteria in Southeast Asia (Chapter 4) and their potential application in the SCS (Chapter 5). **Chapter 4** investigates state practice with respect to the identification or designation of sensitive areas under international instruments in Southeast Asia, including multi-designations. The reason for focusing on Southeast Asia rather than solely on the SCS is the limited number of such identifications in the SCS (essentially due to the political sensitivity created by maritime and sovereignty disputes). Furthermore, the SCS is the largest body of water in Southeast Asia and eight of the 11 states of Southeast Asia are littoral states of the SCS and the Gulf of Thailand -a marginal sea of the SCS- although China is not one of them. Here it can be noted that although China is clearly a SCS littoral state, it is generally not considered as a Southeast

[55] Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter, 29 December 1972, 1046 U.N.T.S. 120, 11 I.L.M 1294 (entered into force 30 August 1975) [1972 London Convention] and the 1996 Protocol to the London Convention, 7 November 1996, 36 I.L.M. 1 (entered into force 24 March 2006) [1996 London Protocol]; Convention on Wetlands of International Importance especially as Waterfowl Habitat, 2 February 1971, 996 U.N.T.S. 245, 11 I.L.M. 963 (entered into force 21 December 1975) [Ramsar Convention]

Asian state. The states of Southeast Asia which are littoral states of the SCS are Brunei, Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam.

Sensitive marine areas that have been identified or designated in Southeast Asia under different instruments are mapped and compared. The criteria retained in different identifications or designations are analysed and compared with each other. They are also compared with the theoretical set of criteria proposed in Chapter 3 to verify the feasibility of applying this list in Southeast Asia.

In order to further test the theoretical set of criteria, **Chapter 5** applies it to the Spratly seamounts area and explores whether the scientific data available could be sufficient for the area to meet the theoretical set of ecological and non-ecological criteria proposed in Chapter 3. This analysis is followed by a discussion of the prospects for the application of relevant international instruments and mechanisms to the Spratly seamounts and their identification or designation as a sensitive area under each of these instruments and mechanisms separately. This discussion acknowledges the sovereignty and maritime boundary disputes in the Spratly seamounts area and the resulting geopolitical sensitivity of this area. However, it is framed so as to avoid having to take a position on these ongoing disputes. Instead, it seeks to bring new elements for discussions on the management and the protection of the disputed area to continue in spite of the disputes that exist in the SCS.

Chapter 6 offers a synthesis of research findings and their potential significance, framed around the intentionally provocative question: so what? It investigates the status and potential role of the many suites of criteria as a whole, despite their having been developed under different environmental instruments of international law. First, it discusses the legal status of these criteria within their respective regimes and as a source of informal law-making. Second, it examines their congruence and the potential meaning of this congruence in the context of the development of soft law and standards as a path toward new norms of international law. Finally, the criteria are placed in the context of UNCLOS and its structuring and integrative functions for all rules relating to the protection of the marine environment. These elements are considered in the context of UNCLOS Article 194(5) -on the protection of rare or fragile ecosystems and of depleted, threatened or endangered species and other forms of marine life- to propose that some of these criteria may provide substantive content to the implementation of UNCLOS Article 194(5). A pathway for action is proposed in this context for Southeast Asia, including the SCS.

5 Scope: Sensitive marine areas vs. Marine protected areas

Although this research topic focuses on the identification of sensitive marine areas with a view to protecting them, it does not focus on the establishment of marine protected areas (MPAs) and their possible merits. Some marine areas that qualify as sensitive areas under international law may qualify as an MPA[56] when others may not,[57] depending on the definition that is being employed at international, regional or domestic levels.

5.1 Definition of an MPA under international law

Under international law, protected areas in general (including protected areas in terrestrial and/or marine areas) are defined in Article 2 of the CBD as:

> a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives.

This is the only definition of a protected area contained in an international (global rather than regional) convention applicable to the marine environment. An important characteristic of this definition is that the objective of the designation is the conservation of the area and that steps are to be taken to fulfil this objective. This general definition has been later (in 2004) interpreted by the COP to the CBD in the context of the marine environment as:

> [an] area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings.[58]

The language used in both definitions suggests that an MPA may not necessarily require legislation. The definition of the CBD states that a protected area may be 'designated or

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[56] For example, Tubbataha Reefs in the Sulu Sea which have been identified as a sensitive area under the CBD, the Ramsar Convention and several other international instruments, would qualify as a MPA on the basis of the stated conservation objective in the Philippines management plan. It is also legally gazetted and protected through numerous measures, including the prohibition of extractive activities and limited human visitation. See Part 2 Chapter 4 section 4.1.2 and Appendix G Tables 2 and 3

[57] A Fisheries Refugia established in Southeast Asia under the guidance of the Southeast Asian Fisheries Development Centre by an intergovernmental working group (to protect breeding or nursery grounds for the purpose of rendering sustainable fisheries of regionally important fish stocks) may not qualify as an MPA under the IUCN definition. See J Day et al (2012) Guidelines for applying the IUCN protected area management categories to MPAs, Gland, Switzerland, IUCN [10]

[58] The CBD COP 'welcomed' the reports of the Ad Hoc Technical Expert Group on Marine and Coastal Areas which defines marine and coastal areas. Although it was only 'welcomed' and not 'endorsed'. This definition has since been part of working discussions, being *de facto* endorsed by the bodies. Report of the Ad Hoc Technical Expert Group on Marine and Coastal Protected Areas, CBD COP7 Decision VII/5 [para 10] and UNEP/CBD/SBSTTA/8/INF/7

regulated and managed' [emphasis added]. The later definition of MPA adds that it may be designated by 'legislation or other effective means'. This echoed the recognition at the 5th World Parks Congress in Durban of the value of other conservation governance models, such as the establishment and management of protected areas by indigenous communities according to traditional mechanisms.[59]

In the 2015 Chagos arbitration case, the arbitral tribunal considered that, in the context of UNCLOS and Article 194(5), an MPA is a measure focused 'primarily on conservation and the preservation of marine ecosystems'; biodiversity was not referred to by the tribunal despite being mentioned several times by the parties as being an objective of this measure.[60] However, the primary purpose of conservation and preservation is highlighted by the tribunal, whereas the 2004 MPA expert definition acknowledged by the CBD did not include conservation as a key component.

By contrast, the FAO defines an MPA, for the purpose of the Responsible Fisheries Guidelines, as 'any marine geographical area that is afforded greater protection than the surrounding waters for biodiversity conservation or fisheries management purposes'[61] [emphasis added]. A fisheries management area, such as an area subject to seasonal closure, would therefore qualify as an MPA, although it may not expressly stipulate that it is established for conservation purposes and may or may not contribute significantly to the conservation of the area.

Interestingly, other international instruments that seek to set aside marine and coastal areas to preserve particular components of these areas and that were negotiated in the early 1970s (e.g. the Ramsar Convention and the World Heritage Convention) do not use the term 'protected area' or MPA.

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[59] JP Brosius (2004) Indigenous peoples and protected areas at the World Parks Congress, Conservation Biology 18: 609-612 and F Berkes (2009) Community conserved areas: policy issues in historic and contemporary context, Conservation Letters 2: 20-25

[60] In the matter of the Chagos Marine Protected Area Arbitration, Republic of Mauritius vs. United Kingdom of Great Britain and Northern Ireland, 18 March 2015, PCA [538]

[61] FAO, Fisheries Management 4, Marine Protected Areas and Fisheries, FAO Technical Guidelines for Responsible Fisheries, FAO, Rome, 2011. Available http://www.fao.org/docrep/015/i2090e/i2090e.pdf; accessed 18 Mar 2022

5.2 Co-evolution of MPA discourses

Lack of a common understanding on expected protective measures and activities which may or may not be permitted in MPAs appears to have allowed an evolution of the concept of MPA since the 1970s or even earlier. The definitions adopted by the CBD in 1992 and later were also general enough to allow these processes to continue.

Several authors considered that as the movement for the establishment of protected areas grew and strengthened, it started to encompass new framing and purpose for protected areas.[62] The initial perception of conservation was focused on protection of 'nature for itself' in its pristine form and favoured setting aside large areas that had undergone minimal human impact to conserve them. This approach to protected areas could even lead to the displacement of the local population living within a designated protected area.[63] New competing conservation notions and narratives would appear to have since entered the protected area movement to create a shared discourse coalition for the establishment of protected areas.

However, the competing and often contradictory interests represented by this coalition result in a lack of a common understanding of (1) what a protected area might be, (2) what human activities may be permitted and (3) what the main purpose of such activities might be. New interests and narratives include a re-centring on local populations and social benefits from protected areas through a community-based conservation approach. The appearance of these new narratives was accompanied by the introduction of private actors in the discussion, including environmental NGOs, and interest groups from the civil society, such as Indigenous and local communities. In turn these new actors favoured the development of market-based mechanisms in the political conservation discourse such as the concept of ecosystem-service as a basis for establishing protected areas, including through the assessment of the carbon storage capacity of a protected area to mitigate climate change. Other ecosystem services are, for instance, the protection against erosion and wave surges provided by coral reefs and mangroves and the nutrient-cycling function of mangroves.[64] These different approaches to conservation assess the effectivity of protected areas in a different manner, ranging from area coverage and biodiversity accounting to social benefits, ecosystem services and even sustainable uses.

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[62] GM Mace (2014) Whose conservation? Changes in the perception and goals of nature conservation require a solid scientific basis, Science 345(6204): 1558-1560 and C Corson et al (2014) Everyone's solution? Defining and redefining protected areas at the Convention on Biological Diversity, Conservation and Society 12: 190-202

[63] Mace (2014) and Corson et al (2014), ibid

[64] C Corson et al (2014), supra note 62

Published literature on MPAs and on state practice reflects these different narratives of competing views behind the establishment of protected areas. It first shows that MPAs became a global concept as a conservation tool of choice since the 1970s when they were first called for by scientists and global conservation initiatives such as the regional seas programme of the UNEP and the National Parks Commission of the International Union for Conservation of Nature (IUCN) -which later became the World Commission on Protected Areas (WCPA).[65] Many MPAs were established by states in the 1970s and 1980s – an estimated 1000 MPAs in 87 countries by 1986.[66] In the 1990s, the concept was subsequently developed in the CBD and the importance of protected areas was highlighted in several soft law instruments.[67] As the movement grew, strengthened and succeeded in pushing international bodies to recommend protected area targets, other competing narratives not based on pure conservation started developing and feeding the MPA movement.

5.3. MPAs and area coverage targets in international ocean policy and the development of other area-based conservation measures (ABCMs) and area-based management tools (ABMTs)

It seems that the first tentative quantitative target to establish MPAs agreed by an intergovernmental body was in the Plan of Implementation of the 2002 World Summit for Sustainable Development (WSSD) in Johannesburg. It was agreed that in order to fulfil the plan, it was necessary for states to establish MPAs, including representative networks of MPAs,

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[65] S Wells et al (2016) Building the future of MPAs – lessons from history, Aquatic Conservation: Marine and Freshwater Ecosystems 26: 101-125 and KL Cochrane (2007) Marine protected areas as management measures: tools or toys?, in Law, Science and Ocean Management, MH Nordquist et al (eds.), Centre for Oceans Law and Policy, Virginia University, Charlottesville (USA)

[66] ME De Silva et al (1986) A bibliographic listing of coastal and marine protected areas: a global survey, Technical report WHOI-86-11, Woods Hole Oceanographic Institution. These included MPAs that were World Heritage Sites (such as the Great Barrier Reef designated in 1981) under the 1972 World Heritage Convention and Ramsar Wetlands Sites under the 1971 Ramsar Convention. See also S Wells et al (2016), ibid

[67] In Agenda 21 adopted in 1992 at the United Nations Conference on Environment and Development, Rio de Janeiro - Brazil, Chapter 17 mentions in three paragraphs that States should designate protected areas in order to protect *inter alia* critical habitats, i.e., for conservation of the marine environment (paras. 17(7), 17(8)(d) and 17(85)). Available https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf; accessed 18 Mar 2022. The CBD itself calls for protected areas to protect biodiversity in Article 8 on in-situ conservation with no distinction between the terrestrial and marine environment. In 1995, CBD COP2 Decision II/10 on conservation and sustainable use of marine and coastal biological diversity (the Jakarta Mandate) recommends States to 'establish or consolidate representative systems of marine and coastal protected areas' (CBD Decision II/10 para 1(b) supports SBSTTA Recommendation 1/8 para 11)

'by 2012 and time/area closures for the protection of nursery grounds and periods'. [68] The same target was reiterated by the United General Assembly Resolution 57/141 on Oceans and Law of the Sea dated 21 February 2003 and annually since.[69]

CBD COP7 (2004) set a similar 10% quantitative target with a different language and possibly slightly different meaning in Annex II to Decision VII/30 on 'Strategic plan: future evaluation of progress'. As a measurement of Goal 1 to promote the conservation of the biological diversity of ecosystems, habitats and biomes, a target 1.1 of 'at least 10% of each of the world's ecological regions effectively managed' is provided in a provisional framework for goals and targets.[70] In 2010, CBD COP10 adopted the Aichi Targets in Decision X/2 which urges Parties and other Governments to implement the Strategic Plan for Biodiversity 2011-2020. This includes its target 11:

> at least 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures and integrated into the wider (…) seascapes. [emphasis added].[71]

The language used in the first instruments could suggest a pure conservation target with representativeness being measured through the coverage requirement applying to each ecological region of the world rather than globally. However, the Aichi Targets introduce the notion that these areas may be of particular importance to ecosystem services rather than only to biodiversity. It also introduces the possibility for effective ABCM as a valid alternative to equitably managed, ecologically representative and well-connected systems of protected areas.

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[68] WSSD Plan of Implementation, para. 31(c). UNGA 57/141 see https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_57_141.pdf

[69] Since the United Nations Summit on Sustainable Development of 2012, the target included in UNGA Resolutions was, however, changed to 2020 on the basis of the target included in CBP COP10 Decision X/2 which refers to 2020.

[70] To note, these quantitative targets were designed to help assess progress towards targets in decision VI/26 on the Strategic Plan for the CBD, following Recommendation 9/10 of the Subsidiary Body on Scientific, Technical and Technological Advice (SBBSTA) in UNEP/CBD/SBSTTA/9/10. This target of 10% 'should not be used to evaluate the level of implementation of the Convention in individual Parties or regions'. COP7 Decision VII/30 Strategic Plan: future evaluation of progress, UNEP/CBD/COP/DEC/VII/30 para 3 and 11 and Annex II

[71] CBD COP10 Decision X/2, UNEP/CBD/COP/DEC/X/2

The same evolution can be observed in the language of the United Nations General Assembly (UNGA). In 2017, the UNGA Resolution Our Future Our Action called for

> effective and appropriate area-based management tools [ABMT] including MPAs and other integrated, cross-sectoral approaches, including marine spatial planning and integrated coastal zone management.[72]

It also reiterated its commitment to achieve the targets of the Sustainable Development Goal (SDG) 14 to conserve and sustainably use the oceans, seas and marine resources for sustainable development. Target 14.5 is to

> conserve at least 10% of coastal and marine areas by 2020, consistent with national and international law and based on the best available scientific information.

Achievement of this target is to be measured in coverage of protected areas in relation to marine areas.[73] Each of those recommendations uses a slightly different language. Although the 2017 UNGA frames MPAs as one ABMT among others, Target 14.5 only invites states to 'conserve' according to 'national and international law' rather than 'establish MPAs'. Only the indicator adopted by the working group refers to protected areas to measure implementation of the target.

However, these targets for coverage of protected areas are widely described in international organisations as a successful methodology, given progress in total area coverage in the last

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[72] UNGA 71/312, Our oceans, our future: call for action, 14 July 2017, A/Res/71/312. Calls for area-based measures, including MPAs and the need that they be effectively managed, ecologically representative and well-connected, have been reiterated annually in the UNGA Resolution on Oceans and Law of the Sea. See, for example, A/RES/67/78 dated 18 April 2013 and UNGA A/72/L.18 dated 22 November 2017. Available https://documents-dds-ny.un.org/doc/UNDOC/GEN/N12/483/28/PDF/N1248328.pdf?OpenElement and https://documents-dds-ny.un.org/doc/UNDOC/LTD/N17/396/23/PDF/N1739623.pdf?OpenElement; accessed 4 Nov 20224

[73] Targets and indicators of SDG14, available https://sustainabledevelopment.un.org/sdg14; accessed 18 Mar 2022. The SDGs were created following UNGA Resolution A/RES/66/288 'The Future We Want' dated 11 September 2012, following the Conference on Sustainable Development in Rio de Janeiro in 2012 (Rio + 20) and the subsequent adoption of the 17 SDGs in UNGA Resolution A/RES/70/1 'Transforming our world: the 2030 Agenda for Sustainable Development' dated 21 October 2015

decade. The 2018 Report of the UN General Secretary on Oceans and the Law of the Sea states that

> currently 16.77% of marine areas under national jurisdiction are protected, indicating the achievement of the quantitative element of Aichi Biodiversity Target 11 in these areas.[74]

5.4 Views from the scientific literature on MPA establishment and effectiveness

The success of these targets is further encouraged by a push from scientists and some NGOs for effective protection of 30% of oceans.[75] Reports of progress in establishing MPAs highlight that 20 very large MPAs (VLMPAs) comprise 70% of the total MPA coverage.[76] Scientific views on the value of these VLMPAs vary. Some argue that their large scale is critical to represent all types of marine systems and encompass entire ecosystems, including mobile habitats.[77] This view is based on the recognition that MPA establishment has until now primarily focused on nearshore and shallow-water habitats. Furthermore, these VLMPAs may make it possible for the world to meet the protected area targets set by international ocean law and policy bodies.[78] However, most articles on this topic are very critical of VLMPAs on both a scientific basis and a socio-political basis. They argue that remote VLMPAs 'threaten to undermine the very purpose and objectives of the Aichi biodiversity targets'.[79]

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[74] Report of the Secretary General on Oceans and The Law of the Sea, 5 September 2018, A/73/368 [para. 85]. Available http://undocs.org/a/73/368; accessed 18 Mar 2022

[75] The IUCN World Park Congress 2014 in Sydney resulted in the Promise of Sydney, a new objective 'to create a fully sustainable ocean, at least 30% of which has no extractive activities'. IUCN World Park Congress Sydney 2014, A strategy of innovative approaches and recommendations to enhance implementation of marine conservation in the next decade, 22 December 2014. Available https://www.iucn.org/sites/dev/files/import/downloads/promise_of_sydney_marine_component_1.pdf; accessed 18 Mar 2022. This has been reiterated since by scientists and the World Park Congress. BC O'Leary et al (2016) provide a review of scientific proposals on this topic and indicate that the according to these, the required coverage for protection to achieve, maximize or optimize MPA objectives was 37%. BC O'Leary et al (2016) Effective coverage targets for ocean protection, Conservation Letters 9: 398-404

[76] Size distribution of MPAs in the "protected planet atlas" developed by the World Conservation Monitoring Centre and the IUCN. Available https://www.protectedplanet.net/marine#size-distribution; accessed 18 Mar 2022

[77] RJ Toonen et al (2013) One size does not fit all: the emerging frontier in large-scale marine conservation, Marine Pollution Bulletin 77: 7-10. GJ Edgar et al consider large size (>100km^2) and isolation to be §["'''. ;§;p/two key success features for MPAs. GJ Edgar et al (2014) Global conservation outcomes depend on marine protected areas with five key features, Nature 506: 216-220

[78] RJ Toonen et al (2013), ibid

A key concern is that monitoring of compliance with restrictions on activities in such VLMPAs is generally insufficient as it is technically difficult and requires substantial investment. Where the MPA encompasses an entire EEZ, they also argue that compliance monitoring may be unrealistic. T Agardy et al (2011) highlighted that MPAs can create an illusion of protection when in fact no protection is occurring.[80] P Leenhardt et al (2013) also argue that VLMPAs can be used to (artificially) enhance a state's sovereignty, sometimes against the interest of indigenous populations.[81]

Scientists concerned with the accounting of paper parks (areas that may have been categorised by a state as an MPA but where no protection measures have been implemented or are being complied with) provide new guidance for MPA design. However, they generally do not refer to or take into account features already adopted under international instruments, such as the identification of EBSAs and the establishment of networks of MPAs under the CBD, and other types of sensitive marine areas under the Ramsar Convention and the World Heritage Convention. For example, authors propose different approaches based on an ocean science and policy approach to prioritize the establishment of MPAs, with an emphasis on ecological criteria including priority areas for conservation,[82] biodiversity hotspots,[83] wilderness areas, species-specific approaches,[84] habitats and species

[79] PJS Jones and EM De Santo (2016) Viewpoint- Is the race for remote, very large marine protected areas (VLMPAs) taking us down the wrong track? Marine Policy 73: 231-234; P Leenhardt et al (2013) The rise of large-scale marine protected areas: conservation or geopolitics?, Ocean and Coastal Management 85: 112-118; and EM De Santo (2013) Missing marine protected area (MPA) targets: How the push for quantity over quality undermines sustainability and social justice, Journal of Environmental Management 124: 137-146

[80] T Agardi et al (2011) Mind the gap: addressing the shortcomings of marine protected areas through large scale marine spatial planning, Marine Policy 35: 226-232

[81] P Leenhardt et al (2013), supra note 79

[82] This category is used by the ASEAN Centre for Biodiversity. Available https://asean.chm-cbd.net/; accessed 15 Mar 2022

[83] CM Roberts et al (2002), Marine biodiversity hotspots and conservation priorities for tropical reefs, Science 295: 1280-1284 and FE Zachel and JC Habel (eds.) (2011) *Biodiversity Hotspots: Distribution and Protection of Conservation Priority Areas*, Springer-Verlag Berlin Heidelberg

assemblages,[85] distinctive habitats,[86] and biological valuation.[87] Following a review of state practice and the evolution of MPAs through peer-reviewed articles published since the 1070s, G Carleton Ray (2015) also highlighted difficulties in determining MPA boundaries and the importance of adopting an ecosystem- based management approach to ensure that all critical components of the ecosystem are included in the MPA for its protection. [88] Other authors insist on the need for protected areas to be 'effectively' managed, 'ecologically representative' and to include other 'effective area- based conservation measures'.[89]

Despite a recurring call for effective measures, no-take areas, regulations and compliance, the scientific MPA literature does not discuss existing provisions of international law available for this purpose.[90] Furthermore, many features that are advocated for in these papers are also referred to in scientific criteria adopted to identify sensitive areas under several international legal instruments. Such features include ecological representativeness of different types of marine and coastal ecosystems and that all critical components of an ecosystem are to be included within an MPA or a connected network of MPAs designed for this purpose.[91]

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[84] RA Mittermeier et al (1998) Biodiversity Hotspots and Major Tropical Wilderness Areas: Approaches to Setting Conservation Priorities, Conservation Biology 12: 516-520

[85] TJ Ward et al (1999) Selecting marine reserves using habitats and species assemblages as surrogates for biological diversity, Ecological Application 9(2): 691-698

[86] This approach attempts to move away from an approach primarily focused on flagship (iconic) species and their habitats to include distinctive (rather than just representative) habitats. See JC Roff and SMJ Evans (2002) Frameworks for marine conservation – non-hierarchical approaches and distinctive habitats, Aquatic Conservation Marine and Freshwater Ecosystems 12: 635-648

[87] S Derous et al (2007) A concept for biological valuation in the marine environment, Oceanologia 49(1): 99-128

[88] GC Ray (2015) Marine protected areas: past legacies and future consequences, Aquatic Conservation Marine and Freshwater Ecosystems 25: 1-5. Ray also recognises that distinguishing between MPAs over the coastal margin and in the open ocean remains relevant; the coastal margin or coastal realm extends from estuaries to the outer part of the submerged continental shelf. AL Green et al (2015) also show the need to include critical ecosystem components, such as home ranges, spawning migrations and ontogenetic shifts in habitats, in the design of MPAs and networks of MPAs in order to incorporate ecological patterns of connectivity. AL Green et al (2015) Larval dispersal and movement patterns of coral reef fishes, and implications for marine reserve network design, Biological Review 90: 1215-1247

[89] JEM Watson et al (2015) Bolder science needed now for protected areas, Conservation Biology 30: 243-248.

[90] For example, GJ Edgar et al (2014), supra note 77 and JEM Watson et al (2016), ibid

[91] Chapters 1 and 2 (Part 1) describe all scientific criteria included in these instruments including these.

By contrast to the conservation-driven push for MPAs, other authors argue that -especially in the context of fisheries management- areas that may not have a stated conservation objective can qualify as MPAs on the basis that they aim to achieve the long-term sustainability of certain fisheries and therefore of fish stocks and critical habitats they rely on.[92]

5.5 The IUCN classification of MPAs and MPA discourses

In an attempt to harmonise different domestic practices in naming and establishing MPAs and enable comparison and computation of MPAs established globally, the IUCN adopted an MPA classification system.[93] The IUCN also sought to clarify protective measures expected in different types of MPAs and activities that may or may not be permitted and fill a gap left by international legal instruments and intergovernmental bodies which do not elaborate on such measures.

First, the IUCN defines a protected area as 'a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.'[94]

Second, Supplementary Guidelines for applying the IUCN protected area management categories, J Day et al (2012) provide clear guidance on what each category is expected to include and on the marine activities that may or may not be carried out according to the seven IUCN categories[95] of MPA: from activities with less impact (such as research of a non-extractive type and non-extractive traditional uses) to activities with more impact, such as the disposal of untreated mining waste. These guidelines state that activities with greater impacts would only

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[92] See KL Cochrane (2007) supra note 66

[93] A Gillespie (2009) Defining internationally protected areas, Journal of International Wildlife Law and Policy 12: 229-247

[94] N Dudley et al (2008) Guidelines for applying protected area management categories, Gland, Switzerland, IUCN. In their historical recollection of the evolution of MPAs in international discourse and in international law, S Wells et al (2016) highlighted that the IUCN's work on MPAs started with the 'critical marine habitats' project focused on high diversity, endemism and productivity, including spawning and nursery grounds, migration stopover points and bottlenecks and areas of importance to vulnerable species, supra note 66 [105]

[95] The seven categories of MPA are: Ia-Strict Nature Reserve, Ib-Wilderness Area, II-National Park, III-Natural Monument or Feature, IV-Habitat and Species Management Area, V-Protected Landscape and Seascape and VI-Protected Area with Sustainable Use of Natural Resources. Available https://www.iucn.org/theme/protected-areas/about/protected-area-categories; accessed 2 Feb 2022

be acceptable in an MPA if it can be managed in a way compatible with the applicable category of MPA. If activities are not compatible with an IUCN category of MPA, the area would not qualify as an MPA according to the IUCN guidelines.[96]

The 2012 Supplementary Guidelines also insist that an area cannot qualify as an MPA under these guidelines if it does not have a stated long-term nature-conservation objective. It may incidentally help to build biodiversity and conservation of seabed habitats (such as a fisheries closure area for fisheries management purposes) would not be sufficient. Nevertheless, an entire MPA is not restricted to only one category. It can be divided into zones or sub-areas which each meet a different category. One MPA may therefore be composed of several categories of MPAs under the IUCN guidelines.[97]

Although the IUCN classification and subsequent guidelines are globally acknowledged, they appear to have had a very limited influence on national legislation on protected areas.[98] They have not been adopted by governing bodies of international instruments either, are even at odds with some treaties,[99] and therefore do not provide an international legal definition for MPAs.

5.6 Legal approach to MPAs under UNCLOS: a regime based on maritime zones and sectoral maritime activities

All studies by legal scholars on MPAs highlight the lack of a definitive legal definition for MPAs under international law.[100] Furthermore, the general definition included in the CBD and adopted by the IUCN focuses on the purpose of conservation of the area identified and is

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[96] J Day et al (2012) [27], supra note 57

[97] N Dudley et al (2008) [24-260], supra note 94

[98] A Gillepsie (2009) [232] reports that less than 10% of all national protected areas legislation appears to have been influenced by the IUCN classification scheme, supra note 93

[99] For example, all Ramsar Wetlands may not qualify as an MPA under the IUCN Classification. Whether it would qualify or not depends on the extent to which activities allowed within a Ramsar Wetland meets one of the categories of MPAs. See Chapter 1 Sections 1.2.2 to 1.2.6

[100] A Gillepsie (2009) [246], supra note 93; IU Jacobsen, Marine Protected Areas in International Law – An Arctic perspective, Brill Nijhoff, Leiden Boston, 2016 [6]; and HD Vu (2014), Towards a network of MPAs in the SCS: legal and political perspectives, Brill Nijhoff, Leiden Boston [2

therefore at odds with the language used and the approach adopted by UNCLOS. Under UNCLOS, conservation is used in the specific context of living resources (e.g. Articles 65 and 117), a subset of the marine environment. The fulfilment of the broader obligation of protection and preservation of the marine environment is a pre-condition to the exercise by states of their sovereign right to exploit their natural resources (Articles 192 and 193). Furthermore, states' rights and obligations with respect to different activities are determined according to both the jurisdictional zones[101] they are taking place in and the type of activity concerned.[102]

A legal approach to MPAs under UNCLOS would therefore seek to identify the maritime zone(s) concerned and the activities to be restricted within it, in order to determine whether one or several states have jurisdiction and/or rights and obligations over the maritime zone and with respect to the activity concerned. As an example, a coastal state may unilaterally declare an area of its EEZ to be a MPA and unilaterally declare fishing and mining restrictions given its sovereign rights over natural living and non-living resources in the EEZ and on the continental shelf.[103] However, it may not restrict freedom of navigation by other states through the EEZ unless the measures have been authorised through the IMO.[104] In the case of cable-laying by another state, the coastal state may not unilaterally exclude cable-laying, but it may consult with potential cable-laying projects to find a suitable solution to accommodate the (high seas) freedom of cable laying and the protection of the marine environment.[105]

A particular element of discord between a legal approach and the MPA discourses described above is the use of 'effectiveness' as a mechanism in its definition. Effectiveness is commonly used as a public policy concept to assess whether one or several measures are meeting the policy objective, including in the field of ocean policy. However, 'effectiveness' is not sufficient to define the type of protective measure needed or the policy, unless it is given a legal definition (such as a threshold). An assessment of the measure and its implementation are generally necessary to determine whether the measure is adequate or should be

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[101] For example, in the territorial sea where costal State's sovereignty extends beyond its land territory and internal waters (UNCLOS, Article 2(1)), whereas in the Exclusive Economic Zone (EEZ), the rights and jurisdiction of coastal state are limited by high seas freedoms enjoyed by other States such as freedom of navigation, according to Articles 58 and 87 of UNCLOS

[102] Different obligations apply to States depending on the type of activities such as fisheries in the EEZ where States have an obligation to determine the allowable catch of living resources and to ensure that they are not endangered by over exploitation (UNCLOS Article 61) or pollution from different types of activities for which States have different obligations

[103] UNCLOS Articles 56(1)(a) and 77

[104] UNCLOS Article 211(5) and (6). See also PSSA Guidelines and routeing measures in Part1 Chapter 2 Sections 2.1.2 and 2.1.3

[105] UNCLOS Articles 58 and 67

revised.[106] Conversely, whether an MPA has been established and whether it is effective are two different questions, as it depends on the agreed measure of effectiveness. The first one can easily be given a legal answer. The second one could also be given a legal answer but a prior policy assessment would be required for this to be envisaged.

Based on the legal definition of protected areas in the CBD, an area would qualify as an MPA if it is 'designated or regulated' as such 'and managed to achieve specific conservation objectives'.[107] According to this definition, an area (terrestrial or marine) would qualify as a protected area if it meets two cumulative conditions:

i. it is designated OR regulated, which implies that legal regulation is not necessary provided that there is some form of official recognition and designation; AND
ii. it is managed to achieve specific conservation objectives; with no specific definition of what 'managed' would be, provided that it has some conservation objectives.

More importantly, this definition does not mention biodiversity as a key objective for this specific mechanism (protected area), although the overall objective of the CBD is the protection of biological diversity.

The definition of an MPA provided by the 2004 CBD COP to interpret the definition contained in the body of the CBD explicitly mentions the two constitutive elements as follows:[108]

i. an area being 'regulated or managed' would be one that is reserved by legislation or other effective means, including custom;
ii. an area would be considered to be managed to achieve specific conservation

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[106] Miles et al distinguish a regime from its effectiveness, being the object to be evaluated and highlight the difficulty in identifying this object. See EL Miles et al (2002), Environmental Regime Effectiveness – Confronting Theory with Evidence, The MIT Press, Cambridge-UK

[107] See above Section 5.1

[108] The CBD COP has been established under article 23 of the CBD with the mandate to adopt its own rules of procedure. Conditions for amendments to the treaty are also provided for in the treaty and involve i*nter alia* a ratification procedure (Article 29 CBD). The primary functions of the COP are to oversee the implementation of the CBD, as well as consider and adopt protocols and amendments to the treaty. However, apart from decisions adopted according to the rules applicable for amendments and protocols, all other decisions are consensus-based, do not modify the treaty and are lot legally binding. For a discussion of the legal status of COP's decisions, see A Wiersema (2009) The New International Law-Makers? Conferences of the Parties to Multilateral Environmental Agreements, Michigan Journal of International Law 31: https://repository.law.umich.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1105&context=mjil; accessed 18 Mar 2022

objectives if it has the effect of providing a higher level of protection to marine and/or coastal biodiversity in this area than it does in the surrounding area.[109]

Therefore, it is not required that protection of biodiversity be made the primary objective of the measures, methods or process by which the MPA is established.

Other elements in the targets are policy indicators, not definitions. Whether a particular number of MPAs would need 'no-take' measures to be adopted to ensure achievement of the target is a different question. Unless the legal definition of MPAs were to be changed by CBD parties, the policy discourse should not be seen as asking whether an area qualifies as an MPA or not. Instead, it should ask whether the MPA target is sufficient for the policy objective of biodiversity conservation. In this context and based on the publications documenting the increasing loss of marine biodiversity, it is very possible that a coverage of 10% of MPAs is not a sufficient target to effectively protect marine ecosystems if MPAs can be defined in such different ways and include ABMTs as well as areas with limited or no effective protective measures. The target may therefore need to be completed with a certain percentage of no-take MPAs deemed necessary to achieve an objective of biodiversity protection.

It is useful at this point to clarify the difference between MPAs, ABMTs and ABCMs. Under international law, a MPA is designated or regulated and managed to achieve specific conservation objectives.[110] By contrast, there is no legal definition of an ABCM. As mentioned above, ABCMs are one of the measures of the Aichi Target 11 which would be complementary to MPAs in order to achieve the 10% Aichi Target.[111] ABMTs came later in the international discourse. They are referred to in the 2017 UNGA Resolution Our Future Our Action as a new

[109] CBD COP 7 Decision VII/5, supra note 58

[110] See legal definition of MPA under international law in section 5.1 above

[111] Supra note 71

wider category of measures that includes MPAs and ABCMs.[112]

5.7 Inconsistent understandings of MPAs and legal confusion: do they matter

Unresolved scientific debates on the most effective protected area design and what may be the conditions for other area-based conservation measures to be 'effective' point to difficulties in assessing progress towards the expected 10% of protection and which areas to take into account in the calculations.[113]

Several accounting methodologies developed in parallel illustrate this difficulty. The MPA computation of the UN World Database of Protected Areas (WDPA) published on the Protected Planet website by UNEP, the World Conservation Monitoring Commission (WCMC) and WCPA is the most all-encompassing; it takes into account all domestic MPAs[114] and is relied on by the UN General Secretary on Oceans and the Law of the Sea in his 2018 report.[115] By contrast, the computation by Conservation International [116] and the IUCN Green List[117] seek to account only for 'truly' conserved protected areas. The Conservation International database tries to identify MPAs that are generally included but are in fact either not implemented or are only planned in order to adjust the MPA number in the Protected Areas in the World Database and better track strongly protected MPAs. It concludes that only 3.7% of global oceans would be protected, with 0.9% of the High Seas, and does not provide a figure for MPA coverage within national jurisdiction. The IUCN Green List focuses on the protection of biodiversity, but, at the time of writing, it has not published figures.

Given the general character of the definition of MPAs in legal instruments and the margin of appreciation left in determining whether an area would qualify as an 'MPA' under international law, there is no international consensus on types of activities that may or may

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[112] UNGA 71/312 supra note 72. See also E Kenchington et al, Consideration for identification of Effective Area-Based Conservation Measures, Research Document 2016/020, Canadian Science Advisory Secretariat, Fisheries and Oceans, 2016. Available https://www.researchgate.net/publication/295549892_Considerations_for_Identification_of_Effective_Area-based_Conservation_Measures; accessed 18 Mar 2022

[113] Supra notes 68, 70 and 72 and generally Section 5.3 above

[114] See https://www.protectedplanet.net/c/about; accessed 15 Nov 2022

[115] Supra note 74

[116] Atlas of Marine Protection and interactive map. Available http://www.mpatlas.org/map/mpas/; accessed 15 Nov 2022

[117] IUCN Green List of Protected and Conserved Areas. Available https://www.iucn.org/commissions/world-commission-protected-areas/our-work/green-list; accessed 15 Nov 2022

not be authorised, limited or forbidden or on other methodologies to determine whether an area would qualify as an MPA.

In focusing on the identification of marine areas that may qualify as 'sensitive' areas under international law, this study does not take into account whether these 'sensitive' areas may qualify as an MPA or which type of MPA would be best suited for these areas. Despite an abundant literature on MPAs, the marine environment can be protected through the restriction of some activities, although this restriction may not be considered as sufficient for the area to qualify as an MPA under different MPA categorisations. Similarly, an MPA can be declared by one or several states in an area where no measures are adopted to effectively protect the marine environment, such as restrictions on activities undertaken in this area.

In the context of Southeast Asia, MPAs have been created under different names, with different authority and with varying (if any) legal status and degrees of conservation. Reports highlight the net increase in environmental degradation despite the numerous parks officially established[118] and nickname them 'paper parks'. In conclusion, identification of a marine area as being 'sensitive' under international law may serve as a preliminary step before the designation of this area for protection under domestic law, as an MPA or otherwise
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[118] UP-MSI, ABC, ARCBC, DENR, ASEAN (2002) Marine Protected Areas in Southeast Asia, ASEAN Regional Centre for Biodiversity Conservation, Department of Environment and Natural Resources, Los Banos, Philippines.

Part 1: Definition and Identification of Sensitive Marine Areas

Introduction

There is mounting pressure from the international community to better protect the marine environment within and beyond national jurisdiction, especially areas considered to be particularly sensitive ecologically and exposed to human activities at sea. The international paradigm that currently aims to protect the marine environment, especially marine biodiversity, evolved from early approaches to protection of the marine environment centred on pollution from activities at sea. The shift towards a more holistic understanding of the protection of the marine environment and inclusion of marine biodiversity can be traced at least to the 1990s with the concept of sustainable development, the landmark of the Earth Summit, and the adoption of the CBD in 1992. The focus on sensitive marine areas and the need for scientific criteria to identify such sensitive areas have also developed greatly since the early 1990s in distinct international fora with a varying degree of exchanges between them.

However, legal definitions of sensitive marine areas can be traced back much earlier, to the late 1960s and early 1970s when environmental sensitivity motivated adoption of the Areas to Be Avoided ships' routeing measures[119] at the International Maritime Organisation (IMO) and the designation of Special Areas under the International Convention for the Prevention of

[119] The earliest recorded Areas to be Avoided for shipping traffic motivated by the environmental sensitivity of these areas was proposed by France on 23 November 1966 for an area in the Region of the Rochebonne Shelf and adopted on 20 November 1973 (NAV IV/2/Add.5 and A.284(VIII)) and by the USSR for the waters off Cape Terpeniya (NAV IV/2/Add.7 and A.284(VIII)). See G. Peet (1994) Particularly Sensitive Sea Areas- A Overview of Relevant IMO Documents, The International Journal of Marine and Coastal Law 9(4): 556-576 [564] and G. Peet (1994) Particularly Sensitive Sea Areas- A Documentary History, The International Journal of Marine and Coastal Law 9(4): 569-506 [571]

Pollution from Ships (MARPOL)[120] to further restrict vessel-sourced discharges of oil, noxious liquid substances in bulk and garbage.[121] The Mediterranean Sea, the Baltic Sea, the Black Sea, the Red Sea and the "Gulfs area" were designated as 'Special Areas' where oil and garbage discharges were further limited[122] and/or where greater protection against pollution by noxious liquid substances in bulk were applied to states parties.[123] Particularly sensitive sea areas also featured in Resolution 9 of the 1978 International Conference on Tanker Safety and Pollution Prevention, which is devoted to the protection of these areas against pollution from ships and from dumping of wastes. Pioneering yet another mechanism to better protect the marine environment against ship-source pollution, the IMO adopted the first set of comprehensive criteria for the identification of Particularly Sensitive Sea Areas (PSSAs)[124] in 1991 for pollution sources and environmental impacts other than those regulated under MARPOL; PSSAs could be protected on the basis of any IMO instruments and routeing measures through the implementation of associated protective measures (APMs).

Another evolution developed in parallel to that of the IMO in the protection and conservation area. Technical work on wildfowl conservation started in 1962, culminating in 1971 in the protection of wetlands of international significance by the Ramsar Convention.[125] In 1972, Principle 2 of the Stockholm Declaration and Recommendation 38 of the Stockholm Action Plan also recommended that governments set aside ecosystems of

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[120] International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978 relating thereto, 1 June 1978, U.N.T.S. 1340, 61 (entered into force on 2 October 1983 for Annexes 1 and 2) [1973/1978 MARPOL Convention]; the original text of this Convention has 5 Annexes: Annex I on the prevention of pollution by oil & oily waste, Annex II on the control of pollution by noxious liquid substances in bulk, Annex III on the prevention of pollution by harmful substances carried by sea in packaged form, Annex IV on the pollution by sewages from ships and Annex V on pollution from garbage from ships

[121] MARPOL, Annexes I, II and V

[122] MARPOL, Annex I, Regulation 10 and Annex V Regulation 5

[123] MARPOL, Annex II, Regulation 1(7)

[124] These guidelines also include a section on the designation of Special Area under MARPOL to assist States parties in the use of this mechanism. 1991 Guidelines for the Designation of Special Areas and Identification of Particularly Sensitive Sea Areas, IMO Assembly Resolution A.720(17). Available https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/AssemblyDocuments/A.720(17).pdf; accessed 19 Mar 2022

[125] Supra note 55

international significance for protection under international instruments.[126] Different criteria were considered at the time that are similar or identical to those later adopted in other fora.[127]

The scientific criteria for the identification of sensitive marine areas developed since the 1990's in different international fora can be divided into two categories. The first category concerns criteria developed to identify areas of particular environmental and cultural sensitivity and to promote a greater degree of protection in these areas. They are included in, or have been derived from, instruments whose main purpose is the conservation of different components of the marine environment. These instruments promote conservation values but provide little specific guidance on activities that may occur and should be restricted within the sensitive areas they seek to identify. Chapter 1 appraises the sensitive area criteria developed in the context of the implementation of the following instruments:

- the 1971 Ramsar Convention led to the development of criteria for the designation of wetlands of international importance;
- the 1972 UNESCO Convention concerning the Protection of the World Natural and Cultural Heritage,[128] (UNESCO World Heritage Convention) led to the development of criteria for the designation of areas of Outstanding Universal Value (OUV);
- the 1979 Bonn Convention on the Conservation of Migratory Species of Wild Animals,[129] (Convention on Migratory Species or CMS) seeks to protect critical habitats and migration corridors of migratory species; and
- the 1992 CBD led to the development of criteria for the identification of Ecologically or

[126] Report of the United Nations Conference on the Human Environment, Stockholm 5-16 June 1972, United Nations, New York, 1973

[127] See C de Klemm and I Créteaux (1995) The Legal Development of the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitats (2 February 1971), Ramsar Convention Bureau, Gland, Swizerland, [6]. Available https://www.ramsar.org/sites/default/files/documents/library/the_legal_development_of_the_ramsar_convention.pdf; accessed 8 February 2021

[128] Convention Concerning the Protection of the World Cultural and Natural Heritage, 23 November 1972, 1037 U.N.T.S. 151, 11 I.L.M. 1358 (entered into force on 15 December 1975) [UNESCO World Heritage Convention]

[129] Convention on the Conservation of Migratory Species of Wild Animals, 23 June 1979, 1651 U.N.T.S. 333, 19 I.L.M. 15 (entered into force on 1 November 1983) [Convention on Migratory Species or CMS]

Biologically Significant Areas (EBSAs).[130] Identification of Biosphere Reserves under the UNESCO Man and the Biosphere Programme is not included in this comparative analysis because it is (i) not established on the basis of a binding treaty;[131] and (ii) not focused on the identification and protection or management of sensitive marine systems.[132]

The second category of criteria for the identification of sensitive marine areas was developed by international organizations and bodies in charge of the regulation, coordination and supervision of specific uses of the sea[133] (in addition to the IMO for shipping). These sets of criteria are designed to identify areas that are exposed and vulnerable to specific activities and are based on particular conservation values. International regulations and guidelines impose or recommend limitations on these activities. These international organisations and bodies include:

- the IMO who pioneered this movement,
- the Conference of the Parties (COP) to the 1972 London Convention and its 1996 Protocol,[134]
- the Food and Agricultural Organization (FAO),[135] Regional Fisheries Management
- Organisations (RFMOs) and the International Whaling Commission (IWC)[136] (with Whaling Sanctuaries) for fishing,[137] and
- the International Seabed Authority (ISA) for deep seabed mining.

The scientific criteria developed by these organisations are described and discussed in Chapter 2.

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[130] Supra note 2

[131] UNESCO's Man and the Biosphere Programme (MAB) is an intergovernmental scientific programme that aims to establish a scientific basis for the improvement of relationships between people and their environments. See the 1995 Seville Strategy and The Statutory Framework of the World Network. Available http://unesdoc.unesco.org/images/0010/001038/103849e.pdf; accessed 19 Mar 2022

[132] Article 4 of the 1995 Statutory Framework sets for the criteria for an area to qualify for designation. These include that the area be of significance for biodiversity conservation (with no reference to OUV), 'encompass a mosaic of ecological systems' including 'human intervention' and be an 'opportunity to explore and demonstrate approaches to sustainable developments on a regional scale', ibid

[133] Legitimate uses of the sea in this context refer to different sectors of activities: fisheries, shipping, mining, etc.

[134] Supra note 55

[135] The Food and Agriculture Organization of the United Nations (FAO) is a competent international organization for the management of fisheries under UNCLOS. UNCLOS Articles 61(1), 61(2), 64 and 119. See T Treves, The Law of the Sea "System" of Institutions (1998) Max Planck Yearbook of United Nations Law 2: 325-340 [329]. Available http://www.mpil.de/files/pdf2/mpunyb_treves_2.pdf; accessed 19 Mar 2022; "Competent or Relevant International Organizations" under the United Nations Convention on the Law of the Sea (1996) Law of the Sea Bulletin 31: 79–95 and JD Kingham and DM McRae (1979) Competent international organizations and the law of the sea, Marine Policy 3: 106-132

It is important to note that UNCLOS is not included in the above list of scientific criteria adopted under the auspices of specialised instruments and competent international organisations because no scientific or technical criteria have been developed by the states parties with the aim of directly implementing its provisions.[138]

However, this is not to say that UNCLOS is not relevant to the identification of sensitive marine areas and their management, on the contrary. First, Chapter 6 examines in great depth the legal value of these scientific and technical criteria adopted under the auspices of other legal instruments under UNCLOS, highlighting the latter pre-eminence and its integrative function in the regime complex that governs all activities at sea and the protection of the marine environment. Second, Article 194(5) contains in itself some broad criteria that are examined in Chapter 6, together with the findings from the analysis of the scientific and technical sensitive area criteria. Article 194(5) provides an unqualified obligation of states to adopt measures 'necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life' in Article 194(5), especially when read in the context of the equally unqualified general obligation to 'protect and preserve the marine environment' in Article 192. Sections 6.2.2.3 to 6.2.2.6 further examine how the scientific and technical criteria must be used to inform UNCLOS Article 194(5), resulting in a legal hierarchy of sensitive areas under UNCLOS. These are also examined in the context of the obligation to act with due diligence in their implementation and the role that can be played in this context by scientific and technical criteria adopted under the auspices of other legal instruments within the same regime complex.

The international instruments discussed in Chapters 1 and 2 are mostly global and therefore applicable to the SCS, based on the adoption of most of these instruments by littoral states of the SCS. Relevant regional instruments are also included even if non-binding. Other international instruments developed for similar purposes but with a geographic scope which does not include Southeast Asia are discussed in Chapter 3 to compare them with criteria that are applicable in the SCS. Chapter 3 also proposes a theoretical set of criteria that encompasses all existing criteria under international law.

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[136] International Convention for the Regulation of Whaling, 2 December 1946, 161 U.N.T.S. 72, 62 Stat. 1716 (entered into force on 10 November 1948) [1946 Whaling Convention or ICRW]

[137] RFMOs and the governing bodies to the Whaling Convention are also competent organizations for the management of fisheries under UNCLOS. See UNCLOS Articles 61, 64, 65, 117 to 120

[138] United Nations Convention on the Law of the Sea, 10 December 1982, 1833 U.N.T.S. 3, 21 I.L.M. 1261 (entered into force on 16 November 1994) [UNCLOS] Unlike UNCLOS which does have treaty bodies to implement its provisions and in the context of which scientific criteria can be adopted, bodies such as the ISA and the FAO do and have adopted such criteria which are discussed in Chapter 2.

Chapter 1: Scientific criteria adopted to implement international instruments for the purposes of protection and conservation of the marine environment

This chapter analyses the scientific criteria developed to identify marine areas that present different characteristics of ecological, social and cultural sensitivity in the context of four multilateral environmental agreements (MEA) and their family of instruments that relate to: biodiversity, wetlands of international importance, world natural heritage and migratory species. The last section of this chapter explores also the relevant declarations and guidance documents adopted by the Association of Southeast Asian Nations (ASEAN).

First, the development of EBSAs under the auspices of the CBD and of criteria for their identification is considered. The reason for starting with the EBSA set of criteria is the comprehensive nature of this set of criteria and the fact that it can be used as a reference to compare with the other sets of criteria. The other instruments (and their associated criteria) are presented chronologically by date of adoption of the source instrument, irrespective of the adoption date of different sets of criteria. The development of each set of criteria began after its 'source' instrument was adopted and progressed in an iterative manner that generally involved several amendments.

The same analytical framework is used for each set of criteria and their originating legal instruments. The elements of the analytical framework are designed to enable a rigorous and systematic comparison of the criteria and assess their relative value.[139] These are set out below:

(i) source instrument and legal background for the adoption of scientific criteria;
(ii) adoption of the instrument by the littoral states of the SCS and the geographic scope of the instrument and criteria;
(iii) scientific criteria;
(iv) listing procedure of areas recognised as meeting the criteria, along with

[139] The first two criteria are based on a mixed methodological approach derived from a traditional legal research methodology focused on sources. The other criteria are more empirical in nature. They are designed to provide the elements necessary to inform a sytematic comparison of the substantive content of the provisions. On the methodology and rationale, see above Introduction, Section 3

global and regional status of the listing process;

(v) reporting, monitoring and review process of areas listed as meeting the criteria; and,

(vi) expected management measures, including any restriction on activities taking place within the listed areas.

1.1 EBSAs

1.1.1 Source instrument and legal background

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.[140] Significant reduction of biodiversity, the combined direct and indirect effects of human activities and the need to anticipate, prevent and combat this significant reduction motivated the adoption of the CBD.[141] Its objectives include the conservation of biodiversity and the sustainable use of its components.[142]

Consequently, the text of the CBD does not distinguish between terrestrial and marine biodiversity. However, although its measures encompass both the terrestrial and marine realms, it appears to have been drafted with terrestrial biodiversity in mind.[143] Furthermore, it does not specify which areas, ecosystems or species should be protected and prioritised and leaves the selection process and management method to each party.[144] Finally, the obligations it includes in its Articles 6 to 11 are heavily qualified as being imposed "as far as possible and as appropriate".

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[140] CBD Preamble

[141] Ibid

[142] CBD Article 1

[143] For instance, the convention focuses on species diversity and areas of high endemism to determine areas where protection would be desirable (See D Freestone, The Conservation of Marine Ecosystems under International Law, in International Law and the Convention on Biological Diversity, C Redgwell, M Bowman, Kluwer Law International, London, Boston, 1996: 91-109). This makes less sense in the context of marine biodiversity because only 20% of known species are marine. Furthermore, endemism is generally low (except for benthic communities), due to the ability of marine organisms to disperse over large geographic scales (unlike terrestrial animals). See S.R. Palumbi (1992) 'Marine Speciation on a Small Planet', Trends in Ecology & Evolution, 7(4): 114-118 and M.V. Angel (1993) 'Biodiversity of the Pelagic Ocean', Conservation Biology, 7(4): 760-772. Other important differences which result in different geographic representations of biodiversity (and a different approach to geographic scale) include the presence of higher orders of the taxonomic classification being more represented in the ocean: 28 phyla of animals compared to 11 on land.

[144] CBD Article 8

Nevertheless, Article 7 provides a clear obligation to identify components of biological diversity (Article 7(a)) and to monitor them (Article 7(b)). Article 7(a) further provides that identification shall have regard to the indicative list of categories set down in Annex I. These categories are grouped under three headings: (1) ecosystems and habitats; (2) species and communities; (3) described genomes and genes of social, scientific and economic importance. These steps of identification and prioritisation are presented as a prerequisite for conservation and sustainable use according to Article 7.

Despite the weak formulation of the obligation being "as far as possible and as appropriate", the need to develop implementation measures for the CBD that are specific to marine and coastal biodiversity became apparent and led to the Jakarta Mandate on Conservation and Sustainable Use of Marine and Coastal Biological Diversity, including a Programme of Work adopted at COP4 (held in 1998).[145] In 2002, the Johannesburg Plan of Implementation highlighted the importance of maintaining the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas beyond national jurisdiction (ABNJ).[146]

This apparently new emphasis on vulnerable marine ecosystems located in ABNJ is also found in the 2003 and 2004 United Nations General Assembly (UNGA) Resolutions on Oceans and the Law of the Sea with particular concern for the conservation and management of vulnerable marine ecosystems in ABNJ. Both of these resolutions also affirm the need for states to develop tools for conserving and managing vulnerable marine ecosystems, including the possible establishment of marine protected areas.[147] Thus, in 2003, the UNGA resolution invited relevant global and regional bodies to urgently investigate how to address this concern, on a scientific basis consistent with international law.[148] Then, in 2004, an Ad Hoc Open-ended Informal Working Group was established by the UNGA to study issues relating to the conservation and sustainable use of marine biological diversity in ABNJ.[149]

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[145] CBD COP4, Decision IV/5 See (4-15 May 1998). Available at https://www.cbd.int/doc/decisions/cop-04/full/cop-04-dec-en.pdf; accessed 19 Mar 2022. This was building on the draft programme attached to Annex II of Decision II/10 the second COP in 1995 (the Jakarta Mandate). Available at https://www.cbd.int/decision/cop/default.shtml?id=7083; accessed 19 Mar 2022

[146] 2002 Johannesburg Plan of Implementation: Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August-4 September 2002, para.32. Available http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/WSSD_PlanImpl.pdf; accessed 19 Mar 2022

[147] UNGA Resolution 58/240, 23 December 2003 [para 54] and Resolution 59/24, 4 February 2005 [para 72]. The abbreviation to VME has come later under the FAO and is therefore not used here.

[148] UNGA Resolution 58/240, ibid [para 52]

Whilst generally grounded on the Part XII of UNCLOS on the protection and preservation of the marine environment, these UNGA resolutions do not refer to the unqualified obligation included in UNCLOS Article 194(5) to

> (…) protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.

Nevertheless, these developments appear to have been the genesis of the work undertaken in the CBD Programme on Marine and Coastal Biodiversity and the cross-cutting issue of Protected Areas as recounted in the preamble of the report of the 2007 expert workshop on the topic.[150] This work led to the adoption by CBD COP9, in 2008, of criteria for identifying EBSAs in need of protection, and the scientific guidance for designing representative networks of Marine Protected Areas (MPAs).[151] The following CBD COP (COP10 in 2010) adopted the Aichi Targets, whose Target 11 aims to conserve 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services by 2020, through, protected areas and other effective area-based conservation measures.[152] To note, the CBD documents refer to the UNGA decision but not to UNCLOS.

1.1.2 Adoption by the littoral states of the SCS and geographic scope

The CBD has 196 states parties, including all the littoral states of the SCS and the Gulf of Thailand.[153] (Table 1.1)

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[149] UNGA Resolution 59/24 [para 73]. See also 'A/RES/59/25 – Resolution adopted by the General Assembly on 17 November 2004 – Sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments (14 January 2005), https://documents-dds-ny.un.org/doc/UNDOC/GEN/N04/477/64/PDF/N0447764.pdf?OpenElement, para. 66; accessed 6 Jan 2022.

[150] CBD COP8 Decisions VIII/24, para. 42 (available https://www.cbd.int/decision/cop/?id=11038 ; accessed 6 Jan 2022) and VIII/21, para.7 (available https://www.cbd.int/doc/decisions/cop-08/cop-08-dec-21-en.pdf; accessed 6 Jan 2022) as well as the report of the 2007 Expert Workshop on Ecological and Biogeographic Classification Systems for Marine Areas in Need of Protection. Available https://www.cbd.int/doc/meetings/mar/ewsebm-01/official/ewsebm-01-02-en.pdf; accessed 6 Jan 2022.

[151] CBD COP9 Decision IX/20, para. 14 and Annex I. Available https://www.cbd.int/doc/decisions/cop-09/cop-09-dec-20-en.pdf; accessed 6 Jan 2022. At the time of the first expert workshop for the development of scientific criteria for the identification of EBSA, Canada had already developed its own criteria for the implementation of its Ocean Act 'to facilitate provision of a greater-than-usual degree of risk aversion in management of activities in such areas'. (DFO (Fisheries and Oceans Canada) Ecosystem Status Report 2004/006, March 2005. Available https://www.dfo-mpo.gc.ca/csas-sccs/Publications/ESR-REE/2004/2004_006-eng.html; accessed 6 Jan 2022. They also called these areas 'EBSA's. The Canadian criteria were discussed at the workshops organized under the auspices of the CBD but new EBSA criteria were developed for the purpose of the implementation of the CBD. On the history of the development of the EBSA criteria, see DC Dunn et al (2014) The Convention on Biological Diversity's Ecologically or Biologically Significant Areas: Origins, Developments and current status, Marine Policy 49: 137-145 [138-140]

[152] CBD COP10 Decision X/2. Available at https://www.cbd.int/doc/decisions/cop-10/cop-10-dec-02-en.pdf; accessed 19 Mar 2022. On the historical development of EBSAs, see DC Dunn et al (2014) ibid

[153] Status of parties to the CBD available https://www.cbd.int/information/parties.shtml; accessed on 6 Jan 2022.

Table 1.1: Adoption of CBD by littoral states of the SCS

Littoral states of the SCS	Date of Adoption[154]
Brunei Darussalam	27 July 2008
Cambodia	10 May 1995
China	29 Dec 1993
Indonesia	21 Nov 1994
Malaysia	22 Sept 1994
Philippines	6 Jan 1994
Singapore	20 Jan 1996
Thailand	29 Jan 2004
Vietnam	14 Feb 1995

The CBD applies to the components of biological diversity in areas within the limits of national jurisdiction.[155] However, it also applies to processes and activities under the jurisdiction or control of a [state party] whether they are carried out within national jurisdiction or beyond the limits of national jurisdiction.[156]

1.1.3 Scientific criteria for the identification of EBSAs

CBD COP9 (2008) adopted seven criteria for the identification of EBSAs set out in Table 1.2 below.[157] Five separate criteria for the establishment of networks of MPAs were separately adopted; EBSAs are one of them.[158]

CBD COP9 also decided to convene an expert workshop to provide scientific and technical guidance on the use and further development of biogeographic classification systems and guidance on the identification of EBSAs that meet the scientific criteria.[159] CBD COP10 took note of the guidance document that resulted from the 2009 Ottawa Workshop (the Ottawa

[154] Adoption by ratification, accession, acceptance, approval or succession

[155] CBD Article 4(a)

[156] CBD Article 4(b)

[157] Supra Chapter 1 Section 1.1.1 above and note 152

[158] The other four are (1) representativity, (2) connectivity, (3) replicated ecological features and (4) adequate viable size (CBD COP9 Decision IX/20 Annex II)

[159] CBD COP9 Decision IX/20, para. 19

Workshop Report and Guidance) and invited states Parties to take it into account when implementing the criteria.[160] This guidance document provided scientific and technical guidance on the use of biogeographic classification systems and identification of marine areas beyond national jurisdiction in need of protection.[161]

Table 1.2: EBSA scientific 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.
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

[160] Decision CBD COP X/29, para. 40. Available https://www.cbd.int/doc/decisions/cop-10/cop-10-dec-29-en.pdf; accessed 19 Mar 2022; Report of the Expert Workshop on Scientific and Technical Guidance on the Use of Biogeographic Classification Systems and Identification of Marine Areas Beyond National Jurisdiction in Need of Protection, UNEP/CBD/EW-BCS&IMA/1/2*, 22 December 2009 [Ottawa Workshop Report and Guidance]. Available https://www.cbd.int/doc/meetings/mar/ebsa-np-01/other/ebsa-np-01-ewbcsima-01-02-en.pdf; accessed 19 Mar 2022. See also Guidance on the Use of Biogeographic Classification Systems and Identification of Marine Areas Beyond National Jurisdiction in Need of Protection, UNEP/CBD/SBSTTA/14/INF/4*, 11 January 2010. Available https://www.cbd.int/doc/meetings/sbstta/sbstta-14/information/sbstta-14-inf-04-en.pdf; accessed 19 Mar 2022; and Training Manual for the Description of Ecologically and Biologically Significant Areas (EBSAs) in the Open-Ocean Waters and Deep-Sea habitats [EBSA Training Manual], UNEP/CBD/SBSTTA/16/INF/9. Available https://www.cbd.int/doc/meetings/sbstta/sbstta-16/information/sbstta-16-inf-09-en.pdf; accessed 19 Mar 2022

[161] UNEP/CBD/EW-BCS&IMA/1/2, 22 December 2009. Available https://www.cbd.int/doc/meetings/mar/ewbcsima-01/official/ewbcsima-01-02-en.pdf; accessed 19 Mar 2022

1.1.4 Listing procedure and status

1.1.4.1 EBSA identification process

At each meeting since the adoption of the EBSA criteria, the CBD COP has reviewed the status of the EBSA identification to assess and encourage progress. The bases for the identification process, the establishment of a repository and the review process were adopted by CBD COP10. The CBD Executive Secretary was requested to organise a series of regional workshops prior to COP11 with a primary objective to facilitate the description of EBSAs. Following the regional workshops, the SBSTTA was requested to prepare 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 to be considered and endorsed in a transparent manner by the COP. This is with a view to including endorsed reports in the repository and to submitting them to all relevant international bodies and organisations, such as the UNGA, the Open-ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction, the FAO and regional organisations.[162] A repository for storing and sharing scientific and technical information and experience related to the application of the scientific criteria on the identification of EBSAs was to be established and a prototype web-based input tool and database was created before COP11.[163]

To assist with the EBSA identification process, the Executive Secretary was also tasked with the preparation of a training manual and modules to meet the capacity-building needs for identifying EBSAs using the scientific criteria.[164] 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 and states parties were invited to use it.[165] This EBSA Training Manual and the results of the Ottawa Reports are provided to each regional workshop as reference material.[166]

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[162] Ibid [para. 42]

[163] It is now fully functional and available at https://www.cbd.int/ebsa/; accessed 10 Mar 2022

[164] Decision CBD COP IX/20, paras. 36, 39 and 40

[165] UNEP/CBD/SBSTTA/16/INF/9. Available https://www.cbd.int/doc/meetings/sbstta/sbstta-16/information/sbstta-16-inf-09-en.pdf; accessed 10 Mar 2022

[166] See, for example, the webpage of the regional workshop for the Seas of East Asia. Available https://www.cbd.int/meetings/EBSAWS-2015-03; accessed 10 Mar 2022. See also the webpage of the regional workshop for the North-East Indian Ocean region. Available https://www.cbd.int/meetings/EBSAWS-2015-01; accessed 10 Mar 2022

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, as well as methodology in case of insufficient data or knowledge. They highlight that the application of the EBSA criteria relies primarily on biological and ecological data relating to the area concerned, which are not always available. Where data or knowledge are insufficient, indicators, proxies and modelling of predicted likelihood of occurrence can be used. Oceanographic information can be used as an indicator of biological and ecological information of uniqueness or rarity (EBSA criterion 1)[167] and models can be used to predict the likelihood of occurrence or abundance of a species from physical and biological oceanographic data to meet EBSA criterion 2 of special importance for life-history stages of species.[168]

1.1.4.2 Regional Workshops

A series of regional workshops were held to describe potential areas for protection in ABNJ that meet the EBSA criteria.[169] Although the initial focus of the EBSA criteria was on ABNJ, workshops also included areas of Exclusive Economic Zones (EEZ) as proposed or agreed by the states having jurisdiction over the relevant EEZs.[170] Fourteen regional workshops were organised between 2011 and 2018 and 279 EBSAs were identified as of CBD COP14 (Table 1.3 below).[171] Following review at the COP, EBSAs identified at the workshop and subsequently recommended by the SBSTTA to the COP are annexed to the respective COP resolution prior to

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[167] Ottawa Workshop Report and Guidance, supra note 161 [41]

[168] Ottawa Workshop Report and Guidance, [42] and EBSA Training Manual [8], supra note 161

[169] CBD COP10 Decision X/29, para. 36

[170] Coastal states have different rights and jurisdictions in different maritime zones generated from the land over which they have sovereignty or sovereign rights as well as in ABNJ. Maritime zones, rights and jurisdiction of states are defined in UNCLOS. Although coastal states have sovereignty over activities in their internal waters and in the 12-NM territorial sea (as defined in UNCLOS), they have sovereign rights over the resources in their EEZ which extends from the seaward limit of the territorial sea up to 200 NM from the baseline from which the breadth of the territorial sea has been calculated.

[171] CBD COP14 Decision XIV/9, 28 November 2018

being included in the repository. A 15th regional workshop was convened on 22-27 September 2019 to facilitate the description of EBSAs in the Northeast Atlantic Ocean.[172] However, the COVID-19 pandemic resulted in the consideration of the proposal for new EBSAs being deferred to the second part of COP15 due to take place in 2022.[173]

At this point most of the world's oceans and seas are considered to have undergone a 'first pass' of the EBSA process.[174] However, this is not to say that no other EBSAs may be added later as 'additional regional or sub-regional workshops may be organised when there is sufficient advancement in the availability of scientific information'.[175] The IUCN provides substantive technical support to the CBD Secretariat and has participated in this capacity in the workshops that led to the development of the EBSAs, the guidelines, and all the regional workshops for the identification of EBSAs.[176]

1.1.4.3 EBSA identification in the Seas of East Asia

For the Seas of East Asia, the workshop took place in Xiamen on 13-18 December 2015 and the conclusions were presented to CBD COP13 in December 2016.[177] The workshop was funded by Japan and hosted by China. Participants included representatives of the coastal states for the geographic area concerned: one representative for Cambodia, Philippines, Myanmar, Philippines, Singapore, Thailand, Timor Leste and Vietnam, two representatives for Korea, Japan and Malaysia, and four representatives for China. There was only one littoral state of the SCS without a representative Brunei Darussalam. The report does not mention this state or any marine area within their jurisdiction.

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[172] 2019 Regional workshop to facilitate the description of EBSAs in the Northeast Atlantic Ocean. Available https://www.cbd.int/meetings/EBSA-WS-2019-01; accessed 6 Jan 2022.

[173] See COP/15/4. Available https://www.cbd.int/meetings/COP-15; accessed 6 Jan 2022

[174] DE Johnson et al (2018) Reviewing the EBSA process: Improving on success, Marine Policy 88: 75-85 [6]

[175] CBD COP11 Decision XI/17 [paras. 9 and 12]. Available https://www.cbd.int/doc/decisions/cop-11/cop-11-dec-17-en.pdf; accessed 10 Mar 2022

[176] E.g., refer to Part 2 Chapter 5 Section 5.1.1

[177] Workshop report, UNEP/CBD/EBSA/WS/2015, 11 April 2016. Available https://www.cbd.int/doc/meetings/mar/ebsaws-2015-03/official/ebsaws-2015-03-04-en.pdf; accessed 10 Mar 2022

Technical support was also provided by marine scientists from CSIRO and administrative support was provided by the CBD Secretariat. Representatives from international/regional organisations and NGOs came from the East Asia-Australasian Flyway Partnership (EAAFP), the Global Ocean Biodiversity Initiative (GOBI), the Northwest Pacific Action Plan (NOWPAP), the Sustainability Initiative in the Marginal Seas of South and South East Asia (SIMSEA) and the World Wide Fund for Nature (WWF).

The workshop agreed that 36 areas meet the EBSA criteria in the workshop area, eight of which are located entirely in the SCS.[179] (Figure 1.1 and Table 1.4 below)

Table 1.3: Regional workshops and corresponding EBSA identification

Regional Workshops[178]	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
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
Total		**327**	**321**	

[178] Workshop dates and EBSA identification numbers are based on reports from CBD workshops and CBD COPs.

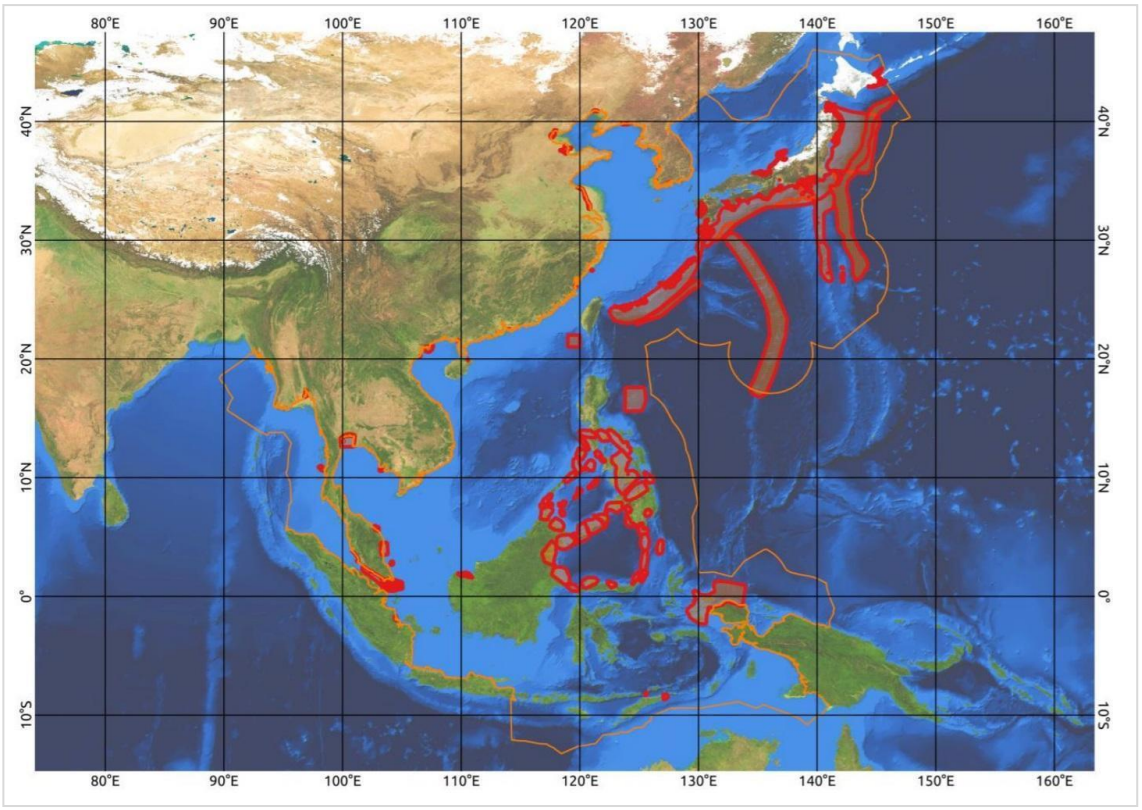

Figure 1.1: EBSAs identified following the regional workshop on the seas of East Asia

EBSAs identified in the Seas of East Asia vary greatly in size ranging from 35km^2 to 480,840km^2 – equivalent to over 37% of the SCS.[180] However, the eight EBSAs in the SCS represent a total area of only 32,443km^2, representing 1.7% of the total area of EBSAs identified in the workshop. They are generally small and coastal, except for one offshore EBSA southwest of Taiwan.

This description of EBSAs in the SCS excludes the Southern Strait of Malacca and the Sulu-Sulawesi EBSAs because they are adjacent to but mostly outside the SCS; it also excludes the Intertidal Areas of East Asian Shallow Seas EBSA which is composed of 20 intertidal areas that form the basis of a flyway[181] network located within the East Asian Seas. More than half of these intertidal areas are located outside the SCS. The absence of consideration of offshore areas in the SCS, especially the Spratly seamounts, is surprising given the purely scientific nature of the EBSA identification process. The extent to which they may meet the EBSA criteria is examined in Part 2 of this study.

1.1.5 Reporting, monitoring and review process

Although a voluntary reporting process is in place for states parties to the CBD to demonstrate implementation of the Programme of Work on Marine and Coastal Biodiversity,[182] no such process is in place for EBSAs. The CBD Repository provides a platform to share new data relating to EBSAs that have been formally identified, but no formal reporting or update mechanisms, or any review process are in place.

When the CBD COP adopted the scientific criteria for identifying EBSAs in need of protection, it recognised

> that when new scientific information as well as experience and results from the practical application [of these criteria] are made available, there may be a need to scientifically review the criteria.

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[179] The table is based on the description of the EBSAs identified in the Workshop for the Seas of East Asia, in CBD COP13 and in the CBD EBSA Repository, supra notes 167 and 164

[180] The SCS, including the Gulf of Thailand and the Gulf of Tonkin is assessed as being 3,8 mi km^2; B Morton and G Blackmore (2001) SCS, Marine Pollution Bulletin 42:1236-1263

[181] A flyway is a route regularly used by a large number of migratory birds. The focus is here on migratory birds that use the coastal and marine environment. The flyway network designates the ensemble of flyways used by migratory birds in a given geographic area.

[182] National reports are available https://www.cbd.int/reports/search/?type=nr-vmc; accessed 19 Mar 2022.

It consequently decided to consider the need to establish a mechanism for such a review after COP10. [183] CBD COP10 decided to review the status and outcomes of application of the scientific criteria for EBSAs as part of its consideration of the work contributing to the implementation of the target of 10% marine protected areas by 2012.[184]

CBD COP13 asked the Executive Secretary to organise an expert workshop to develop options to modify the descriptions of areas meeting EBSA criteria and describe new areas. The Executive Secretary was also asked to strengthen the scientific credibility and transparency of the EBSA process, including by enhancing the scientific peer review by CBD state parties, other Governments and relevant organizations. COP13 also provided for the establishment of an informal advisory group to provide scientific and technical advice on:

- revising and further developing existing scientific guidance, particularly regarding information collection, protocols for data quality control and sharing, gap analysis and systematic assessment against the EBSA criteria, and improvement of the functionality of the EBSA repository;
- the need for additional workshops at the appropriate scale, based on the analysis of new information and a representativeness analysis with regard to the geographic coverage in ABNJ.[185]

A workshop took place on 5-8 December 2017 to develop options for modifying the description of EBSAs, for describing new areas and for strengthening the scientific credibility and transparency of this process.[186]

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[183] CBD COP9 Decision IX/20, para 15

[184] CBD COP10 Decision X/29, para 45

[185] CBD COP13 Decision XIII/12 Annexes II and III

[186] Report of the Expert Workshop to Develop Options for Modifying the Description of EBSAs for Describing New Areas, and for Strengthening the Scientific Credibility and Transparency of this Process, CBD/EBSA/EM/2017/1/3, 3 January 2018. Available https://www.cbd.int/doc/c/6ac0/03a0/d4179dfc152efaeefd81d35e/ebsa-em-2017-01-03-en.pdf; accessed 9 Mar 2022. Relevant to the analysis of criteria for the identification of sensitive areas conducted in this study is a documents submitted to the meeting by the secretariat which included a review of sensitive marine area designation and review processes under international law which provides useful examples of existing review mechanisms that the CBD COP may draw from. See Background Document on International Trends and Distinctive Approaches of Relevance to the CBD Process on Ecologically or Biologically Significant Marine Areas, CBD/EBSA/EM/2017/INF/1. Available https://www.cbd.int/meetings/EBSAEM-2017-01; accessed 5 Jan 2022. See also NJ Bax et al (2015) Results of efforts by the Convention on Biological Diversity to describe ecologically or biologically significant marine areas, Conservation Biology 3: 571-581 and D Johnson et al (2018) Climate change is likely to severely limit the effectiveness of deep-sea ABMTs in the North Atlantic, Marine Policy 87: 111–122

At CBD COP14 in November 2018, decision XIV/9 requested the Executive Secretary to identify options for modifying the description of EBSAs, for describing new areas and for strengthening the scientific credibility and transparency of this process, noting the draft attached in Annex II.[187]

Annex II sets out reasons on the basis of which EBSA descriptions may be modified, actors that may propose them, modalities for the modification process and key considerations for modification. With respect to new areas meeting EBSA criteria, Annex II also contains a draft proposal that includes guidelines for actors that can initiate the description of new EBSAs, modalities and key considerations to undertake such descriptions. Many of these proposed guidelines are based primarily on the maritime zone in which EBSAs are located. With respect to EBSAs located in ABNJ, the current proposal invites any state and or competent international organisation to provide data for modification and take the initiative for a new description. [188]

[187] CBD COP14 Decision XIV/9, 28 November 2018, CBD/COP/DEC/14/9

[188] Ibid

Table 1.4: EBSAs identified following the Workshop for the Seas of East Asia

Workshop EBSA Description	Area Name	CBD COP13 EBSA Identification	Surface Area[189] (km^2)	Coastal or Offshore	Fixed or Dynamic	In SCS[190]
1	Hainan Dongzhaigang Mangrove National Natural Reserve	Yes	161	Coastal	F	Yes
2	Shankou Mangrove National Nature Reserve	Yes	78	Coastal	F	Yes
3	Nanji Islands Marine Reserve	Yes	317	Coastal	F	No
4	Cold Seeps	Yes	11,473	Offshore	F	Yes
5	Muan Tidal Flat	Yes	35	Coastal	F	No
6	Intertidal Areas of East Asian Shallow Seas	Yes	7,590	Coastal	F	Mostly
7	Lembeh Strait and Adjacent Waters	No	-	-	-	-
8	Redang Island Archipelago and Adjacent Area	Yes	6,379	Coastal	F	Yes
9	Southern Strait of Malacca	Yes	24,183	Coastal	Mixed	Adjacent
10	Nino Konis Santana National Park	Yes	1,182	Coastal	F	No
11	The Upper Gulf of Thailand	Yes	9,598	Coastal	F	Yes
12	Halong Bay-Catba Limestone Island Cluster	Yes	3,006	Coastal	F	Yes
13	Tioman Marine Park	Yes	833	Coastal	F	Yes
14	Koh Rong Marine National Park	Yes	915	Coastal	F	Yes
15	Lampi Marine National Park	Yes	994	Coastal	F	No
16	Raja Ampat and Northern Bird's Head	Yes	95,574	Both	Mixed	No
17	Atauro Island	Yes	275	Coastal	F	No
18	Sulu-Sulawesi Marine Ecoregion	Yes	274,495	Most. coastal	F	Adjacent
19	Benham Rise	Yes	38,826	Offshore	F	No
20	Eastern Hokkaido	Yes	2,964	Coastal	F	No
21	Southwest Islands	Yes	8,968	Coastal	F	No
22	Inland Sea Areas of Western Kyushu	Yes	2,874	Coastal	F	No
23	Southern Coastal Areas of Shikoku and Honshu Islands	Yes	7,557	Both	F	No
24	South Kyushu including Yakushima and Tanegashima Islands	Yes	2,401	Coastal	F	No
25	Ogasawara Islands	Yes	1,676	Both	F	No
26	Northern Coast of Hyogo, Kyoto, Fukui, Ishikawa and	Yes	5,202	Coastal	F	No

[189] Surface areas of the polygons provided in a shapefile format in the CBD EBSA repository and calculated through the geometry calculation function of ArcGIS

[190] For the purpose of this study, the SCS basin includes the Gulf of Thailand as their waters are not separated by a strait

	Toyama Prefectures					
27	Ryukyu Trench	Yes	30,037	Offshore	F	No
28	West Kuril, Japan, Izu-Ogasawara and North of Mariana Trenches	Yes	156,212	Offshore	F	No
29	Nankai Trough	Yes	105,412	Offshore	F	No
30	Sagami Trough and Island and Seamount Chain of Izu-Ogasawara	Yes	105,063	Both	F	No
31	Convection Zone East of Honshu	Yes	160,737	Offshore	D	No
32	Bluefin Tuna Spawning Area	Yes	123,518	Offshore	D	No
33	Kyushu Palau Ridge	Yes	222,656	Offshore	D	No
34	Kuroshio Current South of Honshu	Yes	480,840	Offshore	D	No
35	Northeastern Honshu	Yes	4033	Offshore	F	No
36	Hydrothermal Vent Community on the Slope of Southwest Islands	Yes	- [191]	Offshore	F	No
		Total Area	1,896,064			11

[191] This EBSA is described in the workshop report and included in the CBD COP Resolution, but not included in the CBD Repository. Its surface area is therefore not included in the calculation.

1.1.6 Expected management measures

The identification of an area as meeting the EBSA criteria is a scientific and technical exercise. Accordingly, it does not prejudice the sovereignty, sovereign rights or jurisdiction of coastal states, or the rights of other states as provided by UNCLOS.[192]

Although such areas may require enhanced conservation and management measures, their selection and adoption are matters for states and competent intergovernmental organizations, in accordance with international law, including UNCLOS (also recalled in CBD COP's decisions 'acknowledging' or 'welcoming' new EBSAs).[193] However, the very cautious language reiterated in each decision of the CBD COP which is not 'endorsing' or 'acknowledging', but only 'welcoming' EBSA designations suggests an apprehension of states that the identification of EBSAs could result in an obligation to create Marine Protected Areas in these areas.[194]

The identification of an EBSA does not imply that states have an obligation to adopt any specific restriction to marine and/or maritime uses taking place in this area. However, the CBD provides that states have an obligation to

> identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity and monitor their effects through sampling and other techniques.[195]

States also have the obligation to maintain and organise data derived from monitoring and identification of marine biodiversity.[196]

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[192] This is specifically recalled in all decisions relating to EBSAs including in para. 3 of Decision XIII/12

[193] CBD COP10 Decision X/29, para. 26

[194] The legal status of EBSAs and the obligations that may flow from their designation are unclear. Following recommendations for the identification of new EBSAs made in the workshop reports, the SBSTTA's key role is the technical review of these recommendations on the basis of the criteria and data provided. Following this, the COP has the final power to decide whether to accept the SBSTTA recommendation. The language of 'welcoming' the identification according to the SBSTTA recommendation shows that an intention to avoid any legal consequence. However, the COP (like the SBSTTA) can decide to reject a recommendation without motivating it, be it on technical or political grounds.

[195] CBD Article 7(c)

[196] CBD Article 7(d)

[197] CBD COP10 Decision X/2

EBSAs are also expected to inform the implementation of the Aichi Target adopted at CBD COP10[197] and reiterated in target 14.5 of the Sustainable Development Goal 14 for 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, to be conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures.[198]

The initial decision to adopt scientific criteria for the identification of EBSAs was driven by a focus

> on provision of scientific and, as appropriate, technical information and advice relating to marine biological diversity, the application of the ecosystem approach and the precautionary approach.[199]

The intention of CBD's governing bodies is that areas identified as EBSAs also be considered as 'sensitive areas' under other instruments and that maritime and marine uses that are taking place within these areas, as well as pollution from these activities, be regulated within the regime applicable to each activity (e.g. shipping through the International Maritime Organization (IMO), fisheries through the FAO and relevant RFMOs, deep seabed mining through the ISA).[200]

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[198] SDG 14 is included in the 2030 Agenda for Sustainable Development adopted in Resolution 70/1 of the United Nations General Assembly (UNGA), 'Transforming our world: the 2030 Agenda for Sustainable Development', on 25 September 2015. UNGA A/RES/70/1, 21 October 2015. Available http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E; accessed 19 Mar 2022. See also Section 5 of the Introduction

[199] CBD COP8 Decision VIII/24, para. 42

[200] CBD COP9 Decision IX/20, especially paras. 11, 17 and 18, which adopt the scientific criteria to identify EBSAs, emphasizes the importance of coordination with all the relevant international organizations, such as the FAO and IMO, and invites them to apply the EBSA criteria and provide their feedback to assist in the implementation of conservation and management measures. See also Dunn et al (2014), supra note 152

1.2 Wetlands of International Importance

1.2.1 Source instrument and legal background

The objective of the 1971 Ramsar Convention is the wise use of wetlands, in particular conservation and management of wetlands of international significance, in terms of ecology, botany, zoology, limnology and hydrology.[201] The term 'wetland' includes areas of marine waters that are up to six metres deep at low tide; deeper sea areas may also be included in the regime if they are riparian, and coastal zones adjacent to wetlands and islands or bodies of marine water, especially if they support important waterfowl habitat.[202] Each state party commits to 'designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance'.[203]

In order to fulfil the objective of designating and listing wetlands of international significance, the COP to the Ramsar Convention has progressively developed sets of criteria to identify such wetlands. The first set was adopted at the COP1 (Cagliari, 1980) to replace the Heiligenhafen criteria used by states parties since the Convention entered into force.[204] They have since been amended at the Ramsar COP3 (Regina, 1987), COP4 (Montreux, 1990), COP6 (Brisbane, 1996) and COP9 (Kampala, 2005). The first set included four groups of quantitative and qualitative criteria with a focus on certain bird populations supported by wetlands, as well as concerns of representativity, naturalness (absence of significant threat from pollution) and research, education and recreational values. Two types of concerns were removed from the second set of criteria: that a wetland is used for research and education and the condition that it be free from pollution, hydrological interference or other destructive activities.[205]

The focus of concerns was progressively enlarged to include rare, vulnerable and endangered species, genetic and ecological diversity, and critical stages of biological cycles that would be supported by the wetland under consideration.[206]

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[201] Ramsar Convention Articles 2(2), 2(6), 3(1) and 4(1)

[202] Ramsar Convention Articles 1(1) and 2(1)

[203] Ramsar Convention Article 2(1)

[204] Ramsar Recommendation 1.4 [Criteria for identifying Wetlands of International Importance], 24-29 Nov 1980. The Heiligenhafen criteria originated from a ratification-review workshop organised in 1974. C de Klemm and I Créteaux (1995) supra note 128

[205] C de Lemm and I Créteaux (1995) [14], supra note 128

[206] C de Lemm and I Créteaux (1995) [14-19], supra note 128

1.2.2 Adoption by the littoral states of the SCS and geographic scope

The Ramsar Convention has been adopted by 172 states as off 10 October 2021, among which are seven of the nine littoral states of the SCS.[208] (Table 1.5 below) It applies only to the marine and coastal areas located within the jurisdiction of a state party and therefore not to marine areas located beyond national jurisdiction.

Table 1.5: Adoption of the Ramsar Convention by littoral states of the SCS

Littoral states of the SCS	Date of Adoption of Ramsar Convention and 1982 Paris Protocol[209]
Brunei Darussalam	-
Cambodia	23 Jun 1999
China	31 Mar 1992
Indonesia	08 Apr 1992
Malaysia	10 Nov 1994
Philippines	8 July 1994
Singapore	-
Thailand	13 May 1998
Vietnam	20 Sept 1988

The Ramsar Convention has been amended twice. First, the 1982 Paris Protocol primarily established a procedure for amending the Convention. Second, a series of amendments (the Regina Amendments adopted by COP3 in 1987) to Articles 6 and 7 defined the powers of the COPs, established an intersessional Standing Committee, a permanent secretariat and a budget for the Convention. At the same meeting of that COP, the Parties adopted revised criteria for identifying wetlands of international importance and guidelines for the

[207] At COP6 and COP9 Resolution IX.1 Annex B: Revised Strategic Framework and Guidelines for the Future Development of the List of Wetlands of International Importance. Available https://www.ramsar.org/document/resolution-ix1-annex-b- revised-strategic-framework-and-guidelines-for-the-future; accessed 19 Mar 2022. See also An introduction to the Ramsar Convention on Wetlands - International Cooperation on Wetlands, Ramsar Handbook 1, 5th Edition, 2016 [45]. Adopted by Resolution XI.8, annex 2. Available https://www.ramsar.org/sites/default/files/documents/library/handbook1_5ed_introductiontoconvention_final_e.pdf; accessed 19 Mar 2022

[208] Status of adoption of the Ramsar Convention is available on the Ramsar website: https://www.ramsar.org/; accessed 19 Mar 2022

implementation of the wise use of wetlands.[210] According to Article 10(bis) of the Convention (as amended by the Paris Protocol in 1982), the Regina Amendments came into force on 1 May 1994 following acceptance by Denmark, fulfilling the required two-thirds of the nations which were Contracting Parties in 1987. They were then incorporated in the official language versions of the treaty text and applied to all the seven littoral states of the SCS which are state parties, whether they had explicitly accepted it or not.

1.2.3 Scientific criteria

There are now nine criteria for identifying wetlands of international importance under the Ramsar Convention. They are divided into two groups (Table 1.6 below).[211] One group (Group A) relates to sites of representative, rare or unique wetland types. Rarity and uniqueness are also EBSA criteria (EBSA Criterion 1), but representativity is not. The other group (Group B) concerns wetland features that are important for the conservation of wetland biological diversity; these features can relate to species and ecological communities, waterbirds, fish and other taxa. This second group of ecological and biological criteria include quantitative and qualitative elements. For example, a wetland shall be considered internationally important if it regularly supports 20,000 or more waterbirds or 1% of the individuals in a population of one species or subspecies of waterbird or 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.[212]

This quantitative approach differs from the EBSA approach which is more qualitative although quantitative analysis will generally be necessary to inform qualitative criteria such as the EBSA Criteria.

The Ramsar Criteria also include qualitative criteria, such as: supporting vulnerable, endangered or critically endangered species and threatened ecological communities,[213] supporting plant and/or animal species at a critical stage in their life cycles that a particular

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[209] Date of deposit of the instrument of ratification, accession, acceptance, approval or succession. Available http://www.unesco.org/eri/la/convention.asp?KO=15398&language=E&order=alpha; accessed 19 Mar 2022. UNESCO is the Convention's depositary despite the Ramsar Convention not being part of the United Nations and UNESCO system of environmental conventions and agreements. The Ramsar Secretariat is granted under contract to the IUCN.

[210] Available https://www.ramsar.org/search?f[]=field_tag_body_event%3A366&f[]=field_tag_body_event%3A561; accessed 19 Mar 2022

[211] As adopted in COP9 Resolution IX/1. See also last revision of the Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands – 2012 revision, adopted at COP11 Resolution XI/8 Annex 2. Available https://www.informea.org/sites/default/files/decisions/ramsar/cop11-res08-e-anx2.pdf accessed 16 Nov 2022

[212] Ramsar Criteria 5, 6 and 9.

[213] Ramsar Criterion 2

wetland provides refuge for during adverse conditions.[214] The support of critical stages in a species' life cycle is also an EBSA criterion (EBSA Criterion 2). The provision of a refuge during adverse conditions is not.

Table 1.6: Ramsar Sites scientific criteria

Criteria Group		Wetland Characteristics
Group A – Sites containing **representative, rare or unique wetland** types		1- Contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.[215]
Group B – Sites of international importance for **conserving biological diversity**	Species and ecological communities	2- Supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
		3- Supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
		4- Supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.
	Waterbirds	5- Regularly supports 20,000 or more waterbirds.
		6- Regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.
	Fish	7- Supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity
		8- Is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
	Other taxa	9- Regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

[214] Ramsar Criterion 4

[215] In its section devoted to biogeographic regionalization, Ramsar Guidelines refer to Spalding et al (2007) global assessment in which the SCS is divided into two provinces, the SCS (25) and the Sunda Shelf (26), each of which is composed of three and four ecoregions, respectively. The SCS (25), which, geographically corresponds to the northern part of the SCS basin, is composed of the Gulf of Tonkin, Southern China and SCS Islands (it therefore includes the Spratly area and the Paracel area). The Sunda Shelf (26) is composed of the Gulf of Thailand, Southern Vietnam, Sunda Shelf/Java Sea and Malacca Strait. See Spalding et al (2007) Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas. Available https://academic.oup.com/bioscience/article/57/7/573/238419; accessed 19 Mar 2022

A wetland needs to meet only one criterion (from either group) to qualify as a wetland of international importance.[216]

1.2.4 Listing procedure and status

1.2.4.1 Globally

Each state party must designate at least one wetland to be included in the Ramsar List of Wetlands of international Importance (Ramsar List) which is maintained by the Bureau created by the Convention.[217] The responsibility to select a wetland for inclusion in the Ramsar List rests on states parties alone. Each state party can develop its own domestic proceedings to designate a wetland as a Ramsar Site. However, listing a site on the Ramsar List triggers reporting and management obligations under the Convention (further discussed below).[218] Furthermore, the COP is competent to consider information on changes in the ecological character of wetlands included in the Ramsar List and to make specific recommendations to a state party on the conservation, management and wise use of a wetland located within its jurisdiction.[219]

As of 21 May 2018, there were 2,308 listed Ramsar Sites.[220] They cover an area of 2.29 million km^2 and their size varies greatly from one hectare to over 6.5 million hectares. Only one of the five major wetland types is recognized as relevant to this study: marine –and coastal wetlands such as lagoons, rocky shores, seagrass beds, atoll and coral reefs.[221] Globally, they represent 41.6% of the number of Ramsar Sites and 30.4% of their surface area.

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[216] Ramsar Convention Article 2.2 lists alternative characteristics using the coordinating conjunction 'or'. Similarly, the criteria for Identifying Wetlands of International Importance are alternative criteria. See Ramsar COP11 Resolution XI/8, Annex 2 Appendix D [90]. See also Ramsar Handbook 1, supra note 208

[217] Ramsar Convention Article 2(1)

[218] Ramsar Convention Article 3

[219] Ramsar Convention Article 6(2)(c) and (d)

[220] Data available on Ramsar website. Available https://www.ramsar.org/; accessed 23 Feb 2022

[221] Ramsar Handbooks 5th Edition [9], supra note 208

1.2.4.2 In the SCS

Just under 14% of the Ramsar Sites established globally (i.e. 319 sites) are located in Asia;[222] they represent 8% of the total area covered by Ramsar Sites globally. Although this is a relatively small percentage, the number of Ramsar Sites listed in Asia has tripled since the late 1990s. Of the Asian Ramsar Sites, 40% (i.e. 121 sites) are marine and coastal wetlands.

[222] Asia is one of the six geographical regions established for the purpose of implementing the Convention. The COP3 (1987) adopted Resolution III.3 on the establishment of a Standing Committee and the nomination process of its member 'based on upon the principle of proper geographical distribution'. The six regions were established at COP7 (1999) by the adoption of Resolution VII.1. They are Africa, Asia, Europe, Latin America and the Caribbean, North America, and Oceania. Available https://www.ramsar.org/sites/default/files/documents/library/key_res_vii.01e.pdf; accessed 23 Feb 2022

In the countries that border the SCS, there are 44 coastal Ramsar Sites; 20 are located in the SCS.[223] (Table 1.7, Table 1.8 and Figure 1.2 below)

None of those extends beyond the Territorial Sea[224] of the SCS littoral states. Although China has designated the most Ramsar Sites (51% of all the Ramsar Sites in the countries that border the SCS), the largest coastal Ramsar Sites in the SCS are in Vietnam and Thailand. A substantial part of these Ramsar Sites is located in internal waters.

Table 1.7: Coastal Ramsar Sites in the countries that border the SCS

Littoral states of the SCS	Number of Ramsar Sites	Number of coastal Ramsar Sites[225]	Coastal sites in the SCS
Brunei Darussalam	-	-	-
Cambodia	4	1	1
China	49	16	9
Indonesia	7	6	0
Malaysia	7	5	1
Philippines	7	5	2
Singapore	-	-	-
Thailand	14	9	4
Vietnam	8	3	3
Total	96	45	20

[223] Ramsar Sites Information Services statistics. Available https://rsis.ramsar.org/ris-search/?f%5B0%5D=regionCountry_en_ss%3AAsia&pagetab=2; accessed 23 Feb 2022

[224] Ramsar Convention Article 2(1) and text corresponding to supra note 204

[225] Inland wetlands are not included (e.g., Kota Kinabalu Wetland)

Figure 1.2: Coastal and Marine Ramsar Sites in the SCS

Table 1.8: Coastal Ramsar Sites in the SCS[226]

Ramsar Site Name	Location	Size (Ha)	Site Characteristics Based On Ramsar Information Sheet
Koh Kapik and Associated Islets	Cambodia	12,000	Alluvial islands and sand flats. Two main wetland types: estuarine waters, and intertidal mud, sand or salt flats, and mangrove
Fujian Zhangjiangkou Mangrove Nature Reserve	China	2,358	Mangrove, mudflat, intertidal
Guangdong Nanpeng Archipelago Wetlands	China	35,679	Small islands and surrounding waters. Rare and endangered species: marine turtles, sharks, seahorse and seabirds
Guangdong Haifeng Wetlands	China	11,595.5	Typical SCS sub-tropical wetland: tidal flats, reservoirs, ponds, estuaries, mangroves, beaches. Important site for waterbirds
Huidong Harbor Sea Turtle Ntl Nature Reserve	China	400	Green sea turtle breeding ground
Mai Po Marshes and Inner Deep Bay	China (HK)	1,540	Shallow coastal bay with extensive intertidal mudflats backed by dwarf mangroves, shrimp and fishponds
Dongzhaigang	China	5,400	Small shallow sea bay of extensive intertidal mudflats and mangrove swamps.
Zhanjiang Mangrove National Nature Reserve	China	20,279	Largest mangrove forest wetland reserve in China. Support for migrating waterbirds. Site composed of several non-contiguous areas
Shankou Mangrove Nature Reserve	China	4,000	Includes two sites. 14 species of mangrove are represented; important stopover site for a great number of migratory birds
Guangxi Beilun Estuary Ntl Nature Reserve	China	3,000	Mangrove forest and intertidal mudflat. On boundary river with Vietnam
Kuching Wetlands Ntl Park	Malaysia	6,610	Saline mangrove system. Breeding and nursery ground for commercially important fish and prawn species. Endangered species
Las Piñas-Paraňaque Critical Habitat	Philippines	175	Coastal wetland in Manila Bay: mangrove and shallow lagoons. Endangered species
Puerto Princesa Subterranean River National Park	Philippines	22,202	Limestone karst landscape and cave system, mangrove, lowland tropical forest, freshwater swamp, river including mouth in the sea, coastal front
Mu Koh Ang Thong Marine Ntl Park	Thailand	10,200	Marine and estuarine. Includes 42 small islands with sandy beaches, rocky cliffs, coral reefs and young mangrove forests. Rare and threatened species
Don Hoi Lot	Thailand	87,500	Wetland with sandbars at the mouth of the Mae Klong river with intertidal mudflats, economically important mollusc species
Khao Sam Roi Yot Wetland	Thailand	6892	Freshwater marshes and coastal wetlands. Marshland is a biodiversity hotspot. Endangered species. Economic dependency
Ko Kra Archipelago	Thailand	374	Three small rocky islets and surrounding coral reef (biodiversity hotspot). Also nesting ground for hawksbill and green sea turtles
Xuan Thuy Natural Wetland Reserve	Vietnam	12,000	Delta and estuary islands. Last coastal mangrove and mudflat ecosystems in the Red River Delta
Con Dao Ntl Park	Vietnam	19,911	14 islands. 80km from mainland. representative range of coastal and terrestrial ecosystems important for the biogeographic region
Mui Ca Mau National Park	Vietnam	41,862	Largest remaining area of mangrove forests and intertidal mudflats in area. Also UNESCO Biosphere Reserve

[226] The data were extracted from Ramsar Information Sheets accessible in Ramsar Sites Information Services. Available https://rsis.ramsar.org/; accessed 16 Nov 2022

1.2.5 Reporting, monitoring and review process

1.2.5.1 Repository and reporting of changes in ecological characters of a Ramsar Site

The Secretariat has the responsibility to maintain the List of Wetlands of International Importance and note all additions and changes to the List and the Ramsar Sites Information Service.[227] For a site to be included in the Ramsar List, the state party must complete a Ramsar Information Sheet (RIS).[228] States parties are expected to submit completed information sheets for listed sites, including administration and location details, criteria for designation of the site, ecological character and conservation and management measures. Information on disturbances and threats which may affect the site or its surroundings should be included.[229] The description of the ecological character of a site includes a list of ecological components (e.g. species, sediment and water regimes, water pH and salinity, dissolved and suspended nutrients and physical features of the surrounding area which may affect the Ramsar Site), ecological processes and ecological services.[230]

States parties have committed themselves to

> arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change as the result of technological developments, pollution or other human interference.[231]

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[227] Ramsar Convention Article 2(1) and Ramsar Handbook 1 [43], supra note 208. The responsibility was delegated to the International Waterfowl and Wetlands Research Bureau (IWRB), now Wetlands International, in 1999.

[228] COP4 Recommendation 4.7 (1990). The classification system for wetland type is used to identify the different wetland types within each site. See Ramsar Handbook 1 [43-44], supra note 208

[229] Strategic Framework for the future development of the list of wetlands of international importance of the Convention on Wetlands – 2012 Revision adopted by COP11 Resolution XI/8, Annex 2 [55-56], supra note 212. See also COP5 Resolution V.3 on the Procedure for initial designation for the List of Wetlands of International Importance. Available https://www.ramsar.org/sites/default/files/documents/pdf/res/key_res_5.3e.pdf; accessed 23 Feb 2022

[230] Ibid [55]

[231] Several COPs have discussed and adopted recommendations and resolutions relating to the detection, reporting and response to change in ecological character, notably COP5 Recommendation 5.2 which provides guidelines for interpretation of Article 3 ('ecological character' and 'change in ecological character'). Available https://www.ramsar.org/sites/default/files/documents/library/key_rec_5.02e.pdf; accessed 23 Feb 2022

Change in ecological character is defined as

> the human-induced adverse alteration of any ecosystem component, process, and/or ecosystem benefit/service.[232] (…) Information on such changes shall be passed without delay to the Ramsar Secretariat.[233]

According to COP6 Resolution VI.13 (1996), states parties are urged to update their Ramsar Site Information (RSI) and resubmit it to the Secretariat every six years. This way, the information presented in the RIS can form a basis both to monitor and analyse the ecological character of the site and assess the status and trends of wetlands regionally and globally. The Integrated Framework for Wetland inventory, monitoring, and assessment adopted by COP9 Resolution IX.1 Annex E (2005) noted that

> the delivery of the conservation and wise use of wetlands, in line with the commitments embodied in the Ramsar Convention, entails:
>
> (i) establishing the location and ecological characteristics of wetlands (baseline inventory);
>
> (ii) assessing the status, trends and threats to wetlands (assessment);
>
> (iii) monitoring the status and trends, including the identification of reductions in existing threats and the appearance of new threats (monitoring)
>
> (iv) taking actions (both in situ and ex situ) to redress any such changes causing or likely to cause damaging change in ecological character (management).

1.2.5.2 The Montreux Record, de-listing or limitation of site boundaries

The Ramsar Convention allows states parties to delete or restrict the boundaries of a Ramsar Site on the basis of its urgent national interest.[234] However, in such circumstances, the state party is expected to compensate for this loss by creating an additional natural reserve for waterfowl and the protection elsewhere of an adequate portion of the original habitat. [235] The COP can review situations where a Ramsar Site designated for the List prior to the adoption

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[232] COP9 Resolution IX/1, Annex A

[233] Ramsar Convention Article 3(2)

[234] Resolution VIII/20 (2002) provides general guidance for interpreting 'urgent national interests' under Article 2(5) of the Ramsar Convention and considering compensation under Article 4(2). Available https://www.ramsar.org/sites/default/files/documents/pdf/res/key_res_viii_20_e.pdf; accessed 23 Feb 2022. Resolution IX/6 (2005) completes the prior guidance for addressing Ramsar Sites or parts of sites which no longer meet the criteria for designation

[235] Ramsar Convention Article 4(2)

of the latest version of the criteria may no longer meet any of those current criteria, or where a Ramsar Site has subsequently lost the ecological values for which it was originally designated.

Specifically, the COP is competent to 'discuss additions and changes to the List', 'consider information regarding changes in the ecological character of wetlands included in the List', and make recommendations 'to the [states parties] regarding the conservation, management and wise-use of wetlands'.[236]

COP4 established the Montreux Record, a register of Ramsar Sites where changes in ecological character have occurred, are occurring or are likely to occur.[237] Sites are not added to or removed from the Montreux Record without the approval of the relevant state party. At the request of a state party, a technical Ramsar Advisory Mission can be sent by the Secretariat to analyse the situation and advise on measures that could be taken by this state.[238] As of 27 September 2018, 50 Ramsar Sites are listed in the Montreux Record. They are located in Europe, South America, Africa, Middle East and South Asia. None is in Southeast Asia.[239]

The Parties also adopted Guidance for the consideration of the deletion or restriction of the boundaries of a listed Ramsar Site annexed to Resolution IX/6,[240] which recommends a careful eight-step process that Parties shall undertake if deletion or boundary restriction ever become necessary with respect to Ramsar Sites which no longer meet the criteria for

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[236] Ramsar Convention Article 6(2)

[237] COP4 Recommendation 4.8 Guidance for the use of the Montreux record have been amended over time; the last update was adopted by COP12 Resolution XII/6 (2015)

[238] Established by COP4 Recommendation 4/7 (1990), Ramsar Advisory Missions have considered 95 Ramsar Sites as of February 2020. Available https://www.ramsar.org/sites/default/files/documents/library/list_of_ramsar_advisory_missions.pdf; accessed 6 Jan 2022

[239] List of Wetlands of International Importance included in the Montreux Record. Available https://rsis.ramsar.org/ris-https://rsis.ramsar.org/rissearch/?solrsort=ramsarid%20desc&language=en&pagetab=1&f%5B0%5D=montreuxListed_b%3Atrue; accessed 6 Jan 2022. See also Ramsar Handbook 1 [48-49], supra note 208

[240] Ramsar COP9 Resolution IX/6 and its Annex. Available https://www.ramsar.org/sites/default/files/documents/pdf/res/key_res_ix_06_e.pdf; accessed 19 Mar 2022

designation.[241]

1.2.6 Expected management measures and authorised activities

Human uses of wetlands are compatible with listing under Ramsar, provided that they are in line with the Ramsar principle of 'wise use' (sustainable use) and do not lead to an adverse change in ecological character. It is not expected that an area designated as a Ramsar Site be a pristine wetland under strict legal protection. The designation aims to contribute to the 'long-term conservation and wise use of the site'.[242] The guidelines for reviewing laws and institutions to promote the wise use of wetlands focus on the development of national and subnational policies, regulations and institutional responsibilities to ensure the wise use of wetlands. They do not prescribe thresholds of acceptability or activities that should be avoided.[243]

Article 3(1) provides that '[states parties] shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List'. Resolutions from COPs call for management plans for Ramsar Sites, including a monitoring programme with indicators on the Sites' ecological character. The management plan must also be implemented in full. [244] Recommendations and guidance are provided for the preparation of a measurable objective for the management of the site, including the description of the condition required for a feature, the identification of factors that influence the feature and consideration of how the feature may change as a consequence. The setting of operational limits to define a range of values for each factor which will be considered as an acceptable and tolerable level is also

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[241] Ibid [Section IV]

[242] Ramsar Convention Article 3(1) and Ramsar Handbook 1 [62], supra note 208

[243] Ramsar Convention Secretariat (2010) 'Handbook 3 – Laws and institutions: Reviewing laws and institutions to promote the conservation and wise use of wetlands', 4th ed, vol. 3. Available http://www.ramsar.org/sites/default/files/documents/pdf/lib/hbk4-03.pdf; accessed 6 Jan 2022. See also Ramsar Convention Secretariat (2010) 'Handbook 18 – Managing Wetlands', 4th ed. Available https://www.ramsar.org/sites/default/files/documents/pdf/lib/hbk4-18.pdf; accessed 6 Jan 2022

[244] COP8 Resolution VIII/14 adopted new guidelines for management planning for Ramsar Sites and other wetlands, which refer to all the prior guidelines. This resolution also states that 35% of the Ramsar Sites are to have a fully implemented management plan. Available https://www.ramsar.org/sites/default/files/documents/pdf/res/key_res_viii_14_e.pdf; accessed 6 Jan 2022

recommended. COP12 resolution XII.2 (2015) emphasises that 'conversion of coastal natural wetlands has accelerated more than that of inland natural wetlands in the 20th century and that conversion and loss is continuing in all parts of the world, and particularly rapidly in Asia.' As a result, COP12 set a strategic goal to focus on coastal wetlands when addressing the drivers of wetland loss and degradation and strengthening the wise use of wetlands.[245]

Finally, an important provision of the Ramsar Convention in the context of coastal Southeast Asia is Article 5, under which states parties committed to

> consult with each other about implementing obligations arising from the Convention especially in the case of a wetland extending over the territories of more than one [state party] or where a water system is shared by [states parties].

However, no programme or initiative comparable to the Mediterranean Wetlands Initiative exists in Asia.[246]

1.3 Areas of Outstanding Universal Value (OUV)

1.3.1 Source instrument and legal background

The 1972 UNESCO World Heritage Convention aims to inventorise, protect, conserve and preserve world cultural and natural heritage. This includes, with respect to the natural heritage of the marine realm:[247]

> natural features consisting of physical and biological formations or groups of such formations which are of Outstanding Universal Values [OUV] from the aesthetic or

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[245] COP12 Resolution XII/2. Available https://www.ramsar.org/sites/default/files/documents/library/cop12_resolutions_pdf_e.pdf; accessed 6 Jan 2022

[246] The Mediterranean Wetlands Initiative (MedWet) was established in 1991. Available https://www.ramsar.org/news/working-together-for-the-future-of-mediterranean-wetlands; accessed 6 Jan 2022. The annual summary report for 2020 is available at https://medwet.org/wpcontent/uploads/2021/04/MedWet_activities_report2020.pdf; accessed 6 Jan 2022

[247] Like the CBD, the World Heritage Convention applies to the terrestrial and marine realms. It also applies to natural heritage as well as cultural heritage. This study however focuses primarily on the subset which is devoted to natural heritage in the marine realm.

> scientific point of view; geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of [OUV] from the point of view of science or conservation; natural sites or precisely delineated natural areas of [OUV] from the point of view of science, conservation or natural beauty.[248]

Each state party commits to do all it can (to the utmost of its own resources and where appropriate, with any international assistance and co-operation which it may be able to obtain) to identify and delineate sensitive areas of OUV. [249] A particular feature of this Convention is its creation of an intergovernmental committee for the protection of the world cultural and natural heritage, the World Heritage Committee, the main body in charge of the implementation of the Convention.[250] Meetings of this Committee discussed the interpretation of what constitutes OUV and evolved this concept over time: from a restrictive interpretation that limited areas of OUV to areas that were iconic and whose value was unanimously acknowledged as 'best of the best', to a gradual shift towards the representative of the best. The latter requires the inclusion within the nomination of a comparative evaluation of the property being nominated.[251]

This Convention is not intended to ensure the protection of all properties of great interest, importance or value, but only for a select list of the most outstanding of these from an international viewpoint. The Convention and its bodies use the term 'property' rather than 'site'; a term better suited to cultural heritage sites located on state territory. The terms 'area' and 'site' are used interchangeably in this study to facilitate comparison with other types of sensitive areas and because they are better descriptors of marine and coastal areas.

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[248] UNESCO World Heritage Convention Article 2

[249] UNESCO World Heritage Convention Article 4

[250] The World Heritage Committee is composed of 15 State representatives elected by States parties to the Convention. UNESCO World Heritage Convention Article 8.

[251] WHC-06/30.COM/9, Paris, 23 June 2006 [para. 6]. Available http://whc.unesco.org/archive/2006/whc06-30com-09e.pdf; accessed 6 Jan 2022

The UNESCO Marine Programme was established in 2005[252] in recognition of differences in the identification and management of World Heritage Sites in the terrestrial and the marine realms and of the momentum progressively gained for the establishment of networks of protected areas within and beyond national jurisdiction.[253]

1.3.2 Status of Adoption

As of 23 October 2020, 194 states have adopted the World Heritage Convention, including all the littoral states of the SCS.[254] (Table 1.9 below)

Table 1.9: Adoption of World Heritage Convention by littoral states of the SCS

Littoral states of the SCS	Date of Adoption[255]
Brunei Darussalam	12 Aug 2011
Cambodia	28 Nov 1991
China	12 Dec 1985
Indonesia	6 Jul 1989
Malaysia	7 Dec 1988
Philippines	19 Sept 1985
Singapore	19 Jun 2012
Thailand	17 Sept 1987
Vietnam	19 Oct 1987

[252] UNESCO World Heritage papers 45, 'The Future of the World Heritage Convention for Marine Conservation', Dec 2016. Available http://unesdoc.unesco.org/images/0024/002468/246839e.pdf; accessed 6 Jan 2022

[253] Examples include the Jakarta Mandate and the 2002 Earth Summit in Johannesburg, supra Introduction Section 5.2 and 5.3 and Chapter 1 Section 1.1.1. The Marine Programme was created by the World Heritage Committee to support implementation of its global strategy for a representative, balanced and credible World Heritage List. This includes ensuring that bio-geographical regions or events in the history of life are represented in a balanced way. WHC-11/35.COM/INF.9A. Available http://whc.unesco.org/archive/2011/whc11-35com-INF9Ae.pdf; accessed 6 Jan 2022

[254] Status of the adoption of the convention is available on UNESCO website at http://whc.unesco.org/en/statesparties/; accessed 6 Jan 2022

[255] Adoption by ratification, accession, acceptance, approval or succession

1.3.3 Scientific criteria

The criteria developed by the World Heritage Committee over time for the inscription of sites of OUV on the World Heritage List are reflected in the Operational Guidelines for the Implementation of the World Heritage Convention which are periodically revised to reflect the decisions of the Committee.[256] There are 10 criteria, not all of which are relevant to the protection of sensitive marine areas due to their focus on types of cultural heritage not found at sea. Relevant criteria are highlighted in two shades of light blue in Table 1.10 below.

Criteria 7 to 10 are those generally recognised as relevant for the selection of World Heritage marine sites and are used in the selection process of marine sites included in the List.[257] Criteria 5 and 6 relate to traditional human settlements, sea uses, human interactions with the environment, and traditions and beliefs. It is conceivable that they could be considered in the context of marine sites attached to traditional beliefs of islanders and their cultural connectedness with the ocean, for example, those of populations from Pacific island States.[258] To be deemed of OUV, an area must also have an adequate protection and management system to ensure its safeguarding. In addition, criteria of authenticity and integrity are required for cultural heritage. Although authenticity refers to cultural heritage and is therefore not relevant to this discussion, integrity is relevant.

Integrity is a measure of the wholeness and intactness of the natural and/or cultural heritage and its attributes. Examining the conditions of integrity therefore requires assessing the extent to which a site:

(i) includes all the elements necessary to express its OUV;
(ii) is of adequate size to ensure the complete representation of the feature and processes that convey the property's significance; and
(iii) suffers from adverse effects of development and/or neglect. [259]

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[256] Mandate of the World Heritage Committee to define the criteria in provided in Article 11(5). World Heritage Convention Operational Guidelines WHC.17/01, 10 July 2019 [25-26]. Available http://whc.unesco.org/en/guidelines/; accessed 6 Jan 2022

[257] See webpage of UNESCO marine programme. Available http://whc.unesco.org/uploads/activities/documents/activity-13-137.pdf; accessed 6 Jan 2022

[258] See UNESCO's current effort of site selection with the Small Island Developing States. Available http://whc.unesco.org/en/sids/; accessed 6 Jan 2022. Such values have been presented by Papua New Guinea in their application to the IMO for a Particularly Sensitive Sea Area. Designation of the Jomard Entrance as a PSSA, submitted by PNG to MEPC 70, 11 July 2016, MEPC 70/8. See also the discussion on the topic of non-tangible cultural heritage values included in the PSSA Guidelines in MEPC 70/WP9

[259] Decision 20 COM IX.13. See also ibid [paras. 87-95]

Table 1.10: World Heritage Sites criteria of Outstanding Universal Beauty

Criteria	Characteristics of Outstanding Universal Beauty for inclusion in the World Heritage List[260]
1.	Represent a masterpiece of human creative genius [with authenticity and integrity]
2.	Exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design [with authenticity and integrity]
3.	Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared [with authenticity and integrity]
4.	Outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history [with authenticity and integrity]
5.	Outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change [with authenticity and integrity]
6.	Directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance [with authenticity and integrity]
7.	Superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance [with integrity]
8.	Outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features [with integrity]
9.	Outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals [with integrity]
10	Most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation [with integrity]
AND	Adequate protection and management system to ensure safeguarding

This means that with respect to coastal and marine natural heritage, biophysical processes and landform features must be relatively intact and in general that the distinctive character of a site is maintained so that the criteria can continue to be met.[261]

[260] Ibid [paras. 77-119]

[261] Ibid

1.3.4 Listing procedure and status

1.3.4.1 Globally

The UNESCO World Heritage List includes 1073 sites globally, 50 of which are marine sites listed by 37 states parties.[262] (Figure 1.3 and Table 1.11 below) The Galápagos Islands was the first site to be listed in 1978. Listed marine sites include a variety of marine systems and sizes. The larger sites are the Phoenix Islands Protected Area in Kiribati, Papahanaumokuakea in Hawaii, the Great Barrier Reef in Australia and the Galápagos Islands in Ecuador.[263] They extend beyond the Territorial Sea and include seamounts, volcanoes and other deep-sea habitats, whether they are coastal or further offshore. These sites include coastal areas as diverse as deltas, estuaries, mangroves, marshes and other intertidal areas and coastal systems of tropical, temperate, Arctic or Antarctic conditions.

New World Heritage Sites cannot be considered and included in the World Heritage List without prior nomination by a state party through inclusion in the state party's Tentative List.[264] The Tentative List is an inventory of those properties situated on its territory which each state party considers suitable for nomination to the World Heritage List.[265] Preparatory assistance can be sought from the Secretariat of the World Heritage Committee and the relevant Advisory Bodies; in the case of sites in the marine environment, from the IUCN.[266] Following nomination, the Secretariat requests from the IUCN an assessment of the qualities of the site which justify its OUV, whether it meets the condition of integrity, and a review of the

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[262] Their surface area is 408,250 km^2, 362,075 km^2, 348,700 km^2 and 140,665 km^2. Data compiled from the database of the World Heritage List available http://whc.unesco.org/en/interactive-map/; accessed 6 Jan 2022. See also https://whc.unesco.org/en/list/&search=&themes=7&order=year#alpha2019; accessed 6 Jan 2022.

[263] Ibid

[264] Decision 24 COM para. VI.2.3.2. Specific format and information must be followed by the nominating State. World Heritage Convention Operational Guidelines, supra note 257

[265] World Heritage Convention Articles 1, 2 and 11 and Decision 39 COM 11. Tentative Lists are also prepared at the request of the Committee by ICOMOS and IUCN to identify gaps in the World Heritage List. ICOMOS is the International Council on Monuments and Sites, a professional association that works for the conservation and protection of cultural heritage places around the world.

[266] World Heritage Convention Article 8(3). The relevant Advisory Body for the natural heritage is the IUCN

protection and management measures in place.[267] The IUCN also provides an analysis of the site in a global, regional and/or thematic context to ensure that listing of the site meets the aims of the Convention.[268] Subsequently, the IUCN makes a recommendation for either:

(i) listing without reservation;
(ii) listing refusal;
(iii) listing referral or deferral.[269]

The World Heritage Committee decides whether a site should or should not be listed, referred or deferred.[270] If a state wishes to modify the boundaries of a listed World Heritage site and this modification is considered by the World Heritage Committee as having a significant impact on the extent of the site or effect on its OUV, the procedure of a new nomination must be followed, including an inscription in the Tentative List.[271]

The listing cycle of a site is one and a half to two years if the nomination information is complete.

Two current work streams of UNESCO may result in new marine sites on the World Heritage List.[272] First, the UNESCO SIDS Programme provides support for new nominations to the World Heritage List, and sustainable conservation and management practices for sites already inscribed.[273] Second, identification of areas of OUV in ABNJ, which represents more than 60% of the oceans, and discussions on the establishment of World Heritage Sites in this part of the

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[267] Regional experts familiar with the subjects are expected to be involved in the assessment. World Heritage Convention Guidelines [39], supra note 257

[268] A global overview of wetland and marine protected areas on the world heritage list, IUCN, 1997, Switzerland. Available https://portals.iucn.org/library/sites/library/files/documents/WH-WP-002.pdf; accessed 6 Jan 2022

[269] Ibid [40]

[270] Listing refusal specifies the exceptional circumstances in which listing could be reconsidered. Referral means referral back to the state party for additional information. Deferral can be decided for more in-depth assessment. Ibid [41-42]

[271] World Heritage Convention Operational Guidelines [paras. 163-166], supra note 257

[272] Despite the Strategic Action Plan and Vision to guide the implementation of the World Heritage Convention over the decade 2012-2022 focusing primarily on existing sites rather than new sites, especially in the marine realm. See the World Heritage Committee to UNESCO General Assembly dated 2 Oct 2017, WHC/17/21.GA/9. Available http://whc.unesco.org/archive/2017/whc17-21ga-9-en.pdf; accessed 6 Jan 2022

[273] Available http://whc.unesco.org/en/sids/; accessed 6 Jan 2022

oceans.[274] However, the World Heritage Convention and the powers vested in the bodies it created are limited to areas within national jurisdiction despite the preamble of the Convention focusing on the protection of the world heritage of mankind with no geographic limits. Different legal mechanisms can be envisaged to enlarge the World Heritage Committee with a mandate that would encompass the World Heritage sites beyond national jurisdiction but they all require an international agreement.[275]

This initiative, also supported by the IUCN,[276] was been in the intergovernmental discussions on biodiversity beyond national jurisdiction (the Working Group on BBNJ) launched by the UNGA in 2004. These discussions evolved from an informal working group to an intergovernmental conference to consider the need and methods to identify and adequately protect and preserve World Heritage sites in ABNJ.[277] UNESCO has proposed five sites in ABNJ for consideration: two in each of the Pacific and Atlantic Oceans and one in the Indian Ocean.[278]

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[274] M Spalding (2012) Marine World Heritage: Towards a representative, balanced and credible World Heritage List. World Heritage Centre, Paris, UNESCO. Available https://unesdoc.unesco.org/ark:/48223/pf0000217371; accessed 6 Jan 2022; and D Laffoley and J Langley (2010) Bahrain Action Plan for Marine World Heritage. Identifying Priorities and Enhancing the Role of the World Heritage Convention in the IUCN-WCPA Marine Global Plan of Action for MPAs in our Oceans and Seas. Switzerland, IUCN. Available http://whc.unesco.org/document/105357; accessed 6 Jan 2022

[275] World Heritage reports 44, 'World Heritage in the High Seas: An Idea Whose Time Has Come', July 2016, UNESCO, Paris, France. Available https://unesdoc.unesco.org/ark:/48223/pf0000245467; accessed 6 Jan 2022

[276] Marine Natural Heritage and the World Heritage List interpretation of World Heritage criteria in marine systems, analysis of biogeographic representation of sites, and a roadmap for addressing gaps, IUCN 2013.

[277] Initially to an Ad Hoc Open-ended Informal Working Group established in 2004 by UNGA Resolution 59/24 to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction. Subsequently to a Preparatory Committee (PrepCom) established by UNGA Resolution 69/292 (6 July 2015) with the mandate to make substantive recommendations to the General Assembly on the elements of a draft text of an international legally binding instrument (ILBI) under UNCLOS in BBNJ. UNGA Resolution 72/249 decided to convene an intergovernmental conference, under the auspices of the United Nations, to consider the recommendations of the preparatory committee on the elements and to elaborate the text of an ILBI under UNCLOS on the conservation and sustainable use of marine biological diversity of ABNJ. Available http://www.un.org/depts/los/general_assembly/general_assembly_resolutions.htm; accessed 6 Jan 2022

[278] The Costa Rica Thermal Dome and the White Shark café in the Pacific Ocean, the Sargasso Sea and the Lost City hydrothermal field in the Atlantic Ocean, and the Atlantis Bank in the Indian Ocean. World Heritage reports 44 [31-41], supra note 276

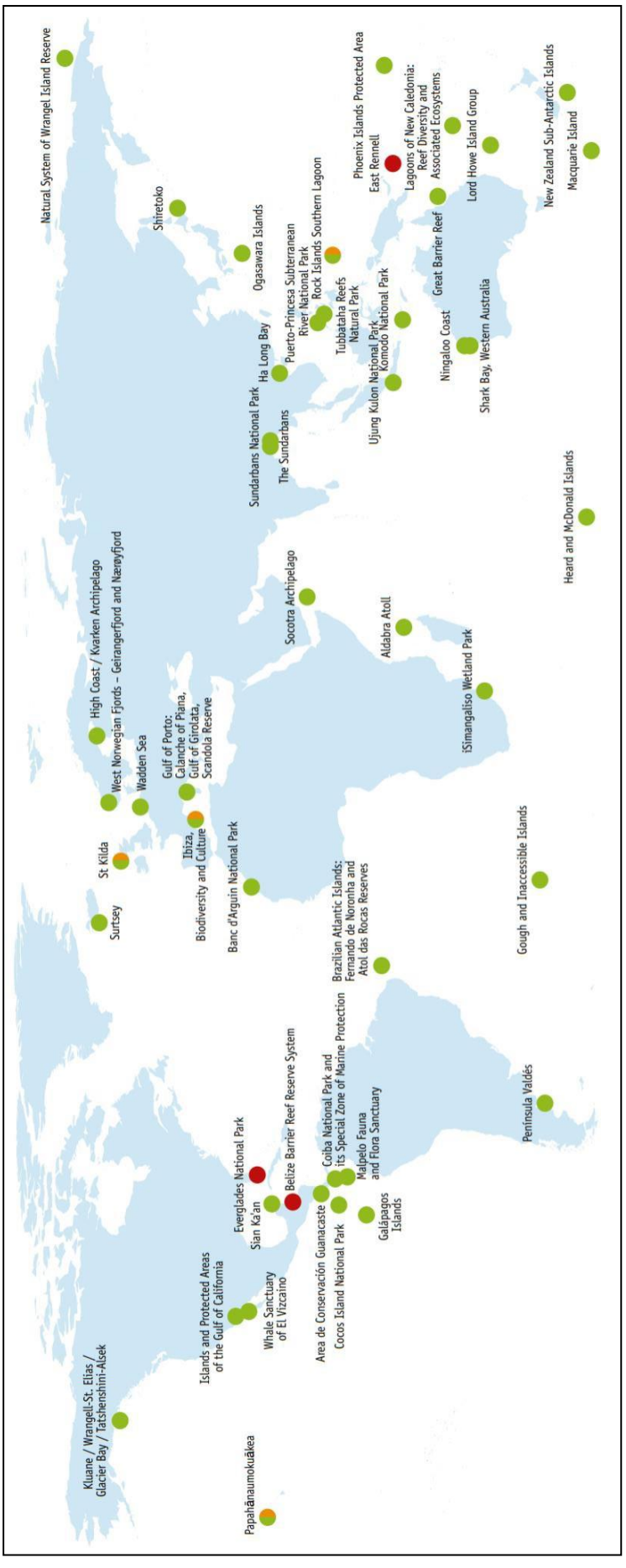

Figure 1.3: Marine and Coastal World Heritage Sites

Table 1.11: Marine sites on the World Heritage List

Site Name	Listing	State
Península Valdés	1999	Argentina
Great Barrier Reef	1981	Australia
Lord Howe Island Group	1982	Australia
Shark Bay, Western Australia	1991	Australia
Heard and McDonald Islands	1997	Australia
Macquarie Island	1997	Australia
Ningaloo Coast	2011	Australia
The Sundarbans	1997	Bangladesh
Belize Barrier Reef Reserve System	1996	Belize
Brazilian Atlantic Islands: Fernando de Noronha and Atol das Rocas Reserves	2001	Brazil
Kluane / Wrangell-St. Elias / Glacier Bay / Tatshenshini-Alsek	1979	Canada, USA
Malpelo Fauna and Flora Sanctuary	2006	Colombia
Cocos Island National Park	1997	Costa Rica
Area de Conservación Guanacaste	1999	Costa Rica
Wadden Sea	2009	Denmark, Germany, Netherlands
Galápagos Islands	1978	Ecuador
High Coast / Kvarken Archipelago	2000	Finland, Sweden
Gulf of Porto: Calanche of Piana, Gulf of Girolata, Scandola Reserve	1983	France
Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems	2008	France
French Austral Lands and Seas	2019	France
Surtsey	2008	Iceland
Sundarbans National Park	1987	India
Ujung Kulon National Park	1991	Indonesia
Komodo National Park	1991	Indonesia
Shiretoko	2005	Japan
Ogasawara Islands	2011	Japan
Phoenix Islands Protected Area	2010	Kiribati
Banc d'Arguin National Park	1989	Mauritania
Sian Ka'an	1987	Mexico
Whale Sanctuary of El Vizcaino	1993	Mexico
Islands and Protected Areas of the Gulf of California	2005	Mexico
Archipiélago de Revillagigedo	2016	Mexico
New Zealand Sub-Antarctic Islands	1998	New Zealand
West Norwegian Fjords – Geirangerfjord and Nærøyfjord	2005	Norway
Rock Islands Southern Lagoon	2012	Palau
Coiba National Park and its Special Zone of Marine Protection	2005	Panama
Tubbataha Reefs Natural Park	1993	Philippines
Puerto Princesa Subterranean River National Park	1999	Philippines
Natural System of Wrangel Island Reserve	2004	Russian Federation
Aldabra Atoll	1982	Seychelles
East Rennell	1998	Solomon Islands
iSimangaliso Wetland Park	1999	South Africa

Site Name	Listing	State
Ibiza, Biodiversity and Culture	1999	Spain
Sanganeb Marine Natl Pk & Dungonab Bay – Mukkawar Is. Marine Natl Park	2016	Sudan
St Kilda	1986	UK
Gough and Inaccessible Islands	1995	UK
Everglades National Park	1979	USA
Papahānaumokuākea	2010	USA
Ha Long Bay	1994	Viet Nam
Socotra Archipelago	2008	Yemen

1.3.4.2 In Southeast Asia

Sites located in Southeast Asia are highlighted in grey in Table 1.11 above; sites in the Asia Pacific are highlighted in lighter grey. Five marine World Heritage sites are in Southeast Asia: in Indonesia, the Philippines and Vietnam. Two are in the SCS and both are also Ramsar Sites: Puerto Princesa Subterranean River National Park and Ha Long Bay. (Table 1.12)

Potential marine World Heritage sites can also be found in the tentative lists of littoral states of the SCS.[279] (Table 1.13)

Table 1.12: Marine World Heritage sites in Southeast Asia[280]

Site Name	Country	Location	Surface area (ha)
Ujung Kulon National Park	Indonesia	Sunda Straits	78,525
Komodo National Park	Indonesia	Java Seas -including straits into the Timor Sea	219,322
Tubbataha Reefs Natural Park	Philippines	Sulu Sea	96828
Puerto Princesa Subterranean River National Park	Philippines	SCS	22,202
Ha Long Bay	Vietnam	SCS	150,000

Five of these sites are located in the SCS or its margin; three are primarily coastal and do not

[279] A 2002 expert workshop tasked with the examination of nomination opportunities for tropical coasts, marine and island sites recommended 'the Spratly Island Group' in the SCS be considered for listing. However, this proposal does not appear to have garnered any momentum within the States concerned. They also recommended that the cluster North Borneo/Balabac Strait/Turtle Island, which is located on the margin of the SCS, be considered. However, there seems to have been no follow-up on this proposal either. Report available https://portals.iucn.org/library/node/8507; accessed 6 Jan 2022

[280] Data extracted from the World Heritage List Information. See supra note 263

extend beyond the Territorial Sea. However, two tentative sites in the Philippines, Apo Reef Natural Park and Coron Island, include sea areas located within straits used for international navigation. This could have management implications in that complete protection measures, such as no-go zones, would conflict with the rules on international transit and freedom of navigation applicable in such maritime zones under UNCLOS. However, advisory areas to be avoided authorised by the IMO for the most sensitive parts of the site would not interfere with the freedom of navigation.[281]

Table 1.13: Tentative List of Marine World Heritage sites in Southeast Asia

SCS littoral states	Tentative sites	Marine sites	In the SCS
Brunei	0	-	-
Cambodia	8	0	-
China[282]	60	2	Dongzhai Port (Hainan Is.)
Indonesia[283]	19	4	0
Malaysia	4	0	-
Philippines[284]	19	4	Apo Reef Natural Park (Mindoro Strait, SCS margin) Coron Island Natural Biotic Area (SCS margin) El-Nido Taytay Managed Resources Protected Area (NW Palawan)
Singapore	0	-	-
Thailand	6	0	-
Vietnam[285]	7	1	Extension of Ha Long Bay to Cat Ba Archipelago

1.3.5 Reporting, monitoring and review process

1.3.5.1 Monitoring, reporting and review procedures

Periodic reporting is viewed as an essential process for the successful implementation of the

[281] UNCLOS Articles 38, 42 and 44. See Part 1 Chapter 2 section 2.1 on possible routeing measures

[282] The other marine site is 'Coast of the Bohai Gulf and the Yellow Sea'. China's Tentative List available at http://whc.unesco.org/en/tentativelists/state=cn; accessed 6 Jan 2022

[283] The marine sites are the Derawan Islands (East Kalimantan), Ranja Ampat (NW Papua), the Historic landscape of Banda Islands and Wakatobi (Sulawesi). Indonesia's Tentative List available at http://whc.unesco.org/en/tentativelists/state=id; accessed 6 Jan 2022

[284] The other marine site is 'Turtle Island Wildlife Sanctuary'. Philippines' Tentative List available at http://whc.unesco.org/en/tentativelists/state=ph; accessed 6 Jan 2022

[285] Vietnam's Tentative List available at http://whc.unesco.org/en/tentativelists/state=vn; accessed 6 Jan 2022

World Heritage Convention.[286] States parties have the obligation 'to take appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation' of the listed heritage.[287] Under the title 'Reports', Article 29 specifically provides that,

> States parties shall, in the reports which they submit to the General Conference of UNESCO (…) give information on the legislative and administrative provisions which they have adopted and other action which they have taken for the application of this Convention, together with details of the experience acquired in this field.

The Convention does not contain specific provisions to report the ecological status and impacts of activities on the ecological characteristics of the site. However, in subsequent discussions on the topic, the 11th General Assembly of the states parties concluded that

> monitoring is the responsibility of the state party concerned and that the commitment to provide periodic reports on the state of the site is consistent with the principles set out in the Convention.[288]

The 29th General Conference consequently required the World Heritage Committee to define the details of the state of conservation of the World Heritage sites to be provided by states parties in their reports.[289] With the new procedure, information communicated prior to listing[290] provides a baseline against which to compare data from later monitoring of a site's characteristics to determine whether the OUV of a site is maintained over time.[291] Periodic

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[286] World Heritage website section on periodic reporting. Available http://whc.unesco.org/en/asia-pacific/; accessed 6 Jan 2022

[287] World Heritage Convention Article 5(d)

[288] Resolution of the 11th session of the General Assembly of States parties [4-5]. Available http://whc.unesco.org/archive/1997/whc-97-conf205-7e.pdf; accessed 7 Jan 2022

[289] Decision of UNESCO 29th General Conference on Periodic reporting. CONF 208 VII.1. Available http://whc.unesco.org/en/decisions/2808/; accessed 7 Jan 2022. See also UNESCO World Heritage webpage on reporting and monitoring available at http://whc.unesco.org/en/118/; accessed 7 Jan 2022

[290] This includes a description of the site and the extent to which it meets the criteria for OUV, state of conservation and factors affecting it, key indicators used for monitoring, protection and management measures. World Heritage Convention Operational Guidelines [34], supra note 257

[291] World Heritage Convention Operational Guidelines [para. 201], supra note 257

reporting on a regional basis is organised by the World Heritage Committee every six years.[292] Assistance can be provided by the Secretariat and the IUCN at the request of states parties. State reports and discussions on the state of conservation of listed World Heritage Sites can be consulted in reports of meetings of the World Heritage Committee.[293]

Each time exceptional circumstances occur, or work is undertaken which may have an impact on the OUV of a World Heritage site, the relevant states parties are expected to submit specific reports and impact studies.[294] The Secretariat, other sectors of UNESCO and the Advisory Bodies to the Committee also report on the state of conservation of specific World Heritage sites under threat. These joint obligations are based on the 'duty of the international community as a whole to cooperate' to protect World Heritage sites.[295] This process is called reactive monitoring.[296] The effectiveness of this monitoring process is currently under review, in order to, *inter alia*, improve the understanding of the process and its associated procedures by all relevant stakeholders.[297]

1.3.5.2 World Heritage in Danger

The World Heritage Committee also has the responsibility to

> establish, keep up to date and publish (…) the 'List of World Heritage in Danger' where major operations are necessary for the conservation of such sites.[298] The Operational Guidelines add that 'When the Outstanding Universal Value of the property which justified its inscription on the World Heritage List is destroyed, the Committee considers

[292] Procedure described in the World Heritage Convention Operational Guidelines [paras. 203-207], supra note 257

[293] See, for instance, the report of the 41st meeting of the World Heritage Committee (Krakow, 2017). Available http://whc.unesco.org/archive/2017/whc17-41com-18-en.pdf; accessed 7 Jan 2022

[294] World Heritage Convention Operational Guidelines [para. 169], supra note 257

[295] World Heritage Convention Article 6(1) and preamble

[296] World Heritage Convention Operational Guidelines [paras. 169-176], supra note 257

[297] On-going review project. Available http://whc.unesco.org/en/activities/912; accessed 7 Jan 2022

[298] World Heritage Convention Article 11(4)

deleting the property from the World Heritage List.[299]

To be inscribed on this List, natural heritage sites must face specific and proven imminent danger or major threats which could have deleterious effects on their inherent characteristics and are amenable to correction by human action.

Inscription of a site on the List of World Heritage Sites in Danger can reveal controversial issues, as shown by the example of the Great Barrier Reef of Australia, where assessment of degradation of the environmental condition of the Great Barrier Reef and the determination of whether it should be listed as 'being in danger' engendered divergent opinions and political push-back before it was decided that the threats did not warrant its inscription as being 'in Danger'.[300] Listing of a site as being 'in Danger' is followed by an annual review by the World Heritage Committee of the state of conservation of this site.[301] Relevant states are expected to

> develop scientific and technical studies and research and to work out such operating methods as will make the state capable of counteracting the dangers that threaten its cultural or natural heritage.[302]

No natural World Heritages sites located in Southeast Asia are currently on this List.

1.3.6 Expected management measures and authorised activities

States parties have a duty to ensure 'the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage situated on [their]

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[299] World Heritage Convention Operational Guidelines [para. 9], supra note 257

[300] 41st meeting of the World Heritage Committee Decision 41 COM 7B.24 [100]. Available https://whc.unesco.org/en/decisions/7027/; accessed 18 Mar 2022. On the debate, see for example O Milman (July 2015) 'Great Barrier Reef: Australia says UNESCO decision shows it is a 'world leader''. Available https://www.theguardian.com/environment/2015/jul/02/great-barrier-reef-australia-says-unesco-decision-shows-it-is-a-world-leader; accessed 7 Jan 2022

[301] Procedure for the inscription on the List of World Heritage in Danger is described in paras. 177-191, World Heritage Committee Decision, ibid

[302] World Heritage Convention Article 5(c). Some sites that were listed as being 'In Danger' were eventually removed from the List, following action by the relevant State and successful restoration of the integrity of their OUV. Available http://whc.unesco.org/en/107/; 7 Jan 2022

territory'.[303]

Although neither the Convention itself, nor subsequent guidelines, contain specific indications of activities that may or may not take place within a World Heritage Site, the Convention requires ongoing monitoring of the characteristics which earned the site its status (and listing) as a world heritage site of OUV so that should these key characteristics be lost, the eligibility of the site (as being of 'OUV') will be reconsidered.[304]

1.4 Critical Habitats and ecological networks for migratory species listed in the Convention on Migratory Species and related instruments

1.4.1 Source instruments and legal background

The 1979 Migratory Species Convention highlights the conservation of migratory species of wild animals in general (terrestrial, avian and marine) and focuses on two categories of migratory species in particular:

- those listed in Appendix I to the Convention on the basis that they are endangered,[305] meaning that they are 'facing a very high risk of extinction in the wild in the near future',[306]
- those listed in Appendix II to the Convention on the basis that they have an unfavourable conservation status[307] which require or would benefit from international cooperation for their conservation.

The Convention provides for obligations for Range States, which include any state (in relation to a particular migratory species)

> that exercises jurisdiction over any part of the range of that migratory species, or a state,

[303] World Heritage Convention Article 4

[304] UNESCO (30 June 1977) 'World Heritage Committee – First Session' Section I(A)(5)(iv). Available http://whc.unesco.org/archive/opguide77a.pdf; accessed 7 Jan 2022

[305] Convention on Migratory Species Article III

[306] CMS COP12 (2017) Resolution 11.33. Available http://cms.int/en/document/guidelines-assessing-listing-proposals-appendices-i-and-ii-convention-0 ; accessed 7 Jan 2022

[307] Convention on Migratory Species Article IV(1)

flag vessels of which are engaged outside national jurisdictional limits in taking that migratory species.[308]

Should activities occur beyond national jurisdiction, states and the COP of this convention would seek cooperation with relevant international authorities (e.g. the relevant RFMOs in the context of large migratory species that may be caught as by-catch, such as protected sharks under the 2010 Memorandum of Understanding (MOU) on the Conservation of Migratory Sharks).[309]

With respect to Appendix I species, the obligations of Range States include the conservation and, where feasible and appropriate, the restoration of the habitat of these species which are of importance in removing the species from danger of extinction.[310] These include critical habitats in the range of each species. With respect to Appendix II species, Range States shall endeavour to conclude agreements to restore the migratory species concerned to a favourable conservation status.[311] Such agreements may, for instance, include provisions for the maintenance of a network of suitable migratory routes and sound management of the taking of these species.

Overall, CMS seeks to identify threatened and endangered migratory species, the nature of the threats they face, their migration routes, and ecological characteristics, in order to set a framework for protection. The listing of new species is adopted at the COPs by a two- thirds majority of parties present and voting,[312] following a proposal by a state party and taking into

[308] Convention on Migratory Species Article I(1)(h)

[309] See CMS.int (4-9 November 2014) 'Proceedings of the 11th Meeting of the Conference of the Parties'. Available http://www.cms.int/sites/default/files/publication/cms_cop11_proceedings_e.pdf; accessed 7 Jan 2022, and CMS.int, 'MOU on the Conservation of Migratory Sharks'. Available http://www.cms.int/en/legalinstrument/sharks-mou; accessed 7 Jan 2022

[310] Convention on Migratory Species Article III(4)(a)

[311] Convention on Migratory Species Article V(1)

[312] Convention on Migratory Species Article XI(4).

account the advice of the CMS Scientific Council.[313] As of COP13 on 15-22 February 2020, 667 species are listed in CMS Appendix I and/or Appendix II.[314]

Species-specific initiatives, MOUs and agreements aim to set out the framework and invite Range States to adopt measures to control activities that may have adverse impacts on the species concerned while they are within their jurisdiction (for example, to limit fishing or shipping within migration corridors). Globally, these include seven agreements (regional or taxa-specific agreements),[315] 19 taxa-specific MOUs[316] and three special species initiatives.[317] Of those, four agreements and seven MOUs concern coastal and marine species, including seabirds. Listed species can also be the subject of Concerted Actions, which are

> priority conservation measures, projects, or institutional arrangements undertaken to improve the conservation status of Appendix I and Appendix II species.[318]

The procedural process for the adoption of Concerted Actions has been strengthened since CMS COP11 and guidelines were adopted by COP12 and revised by COP13.[319]

In the context of implementation of CBD Aichi Target 11, which provides for the conservation of 10% of marine and coastal areas by 2020,[320] CMS COP10 (2011), COP11 (2014) and COP12

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[313] CMS COP11 Resolution 11.3. Guidelines for assessing listing proposals to appendices I and II of the Convention. Available http://www.cms.int/sites/default/files/document/Res_11_33_Guidelines_Assessing_Listing_Proposals_E_0.pdf; accessed 7 Jan 2022

[314] See CMS species database. Available http://www.cms.int/en/species; accessed 7 Jan 2022. There has been no other COP since when new species can be listed

[315] ACAP (for Albatrosses and Petrels), ACCOBAMS (for cetaceans of the Black Seas, Mediterranean and contiguous Atlantic area), AEWA (for African-Eurasian migratory waterbirds), ASCOBANS (for small cetaceans in the Baltic, Northeast Atlantic, Irish and North Seas), EUROBATS (for European bats), Gorilla Agreement (for gorillas and their habitats) and Wadden Sea Seals. Available http://www.cms.int/en/cms-instruments/agreements; accessed 7 Jan 2022

[316] See CMS webpage on CMS MOUs. Available http://www.cms.int/en/cms3-instruments/mou; accessed 7 Jan 2022

[317] See CMS webpage on special species initiatives. Available http://www.cms.int/en/cms-intruments/special-initiatives; accessed 7 Jan 2022

[318] CMS COP 13 Resolution 12.28 (Rev.COP13). Available https://www.cms.int/sites/default/files/document/cms_cop13_res.12.28_rev.cop13_e_rev.1.pdf; accessed 20 Jan 2022

[319] Ibid

[320] Supra notes 71 and 72

(2017) engaged in the development of ecological networks to address the needs of migratory species. Target 10 of the CMS Strategic Plan for Migratory Species 2015-2023 (adopted at COP11) also specifically provides that

> all critical habitats and sites for migratory species [are to be] identified and included in area-based conservation measures.[321]

This initiative is based on the recognition that

> habitat destruction and fragmentation are among the primary threats to migratory species and that the identification and conservation of habitats of appropriate quality, extent, distribution and connectivity are thus of paramount importance.[322]

However, as the designation of protected areas across the entire migration range of migratory species is not practically feasible, CMS COP10 adopted a resolution for the identification of ecological networks for the conservation and management of migratory species which focuses on critical habitats and sites.[323] CMS COP10, COP11 and COP12 recognised that 'the identification and conservation of habitats of appropriate quality, extent, distribution and connectivity', as well as of all 'sites that perform a critical role (…) such as core areas, corridors, restoration areas and buffer zones', are critical for the conservation of migratory species and may be linked by 'a concept of ecological networks'.[324] These critical habitats and sites vary from one taxonomic group to another and possibly even species to species.

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[321] COP11 (2014) Resolution 11.2. Available http://www.cms.int/sites/default/files/document/Res_11_02_Strategic_Plan_for_MS_2015_2023_E_0.pdf; accessed 7 Jan 2022

[322] Ibid

[323] CMS COP10 (2011) Resolution 10.3. Available http://www.cms.int/sites/default/files/document/10_03_eco_networks_e_0_0.pdf; accessed 7 Jan 2022

[324] CMS COP10, ibid; CMSCOP11 CMS COP12 (2017) Resolution 12.7. Available http://cms.int/sites/default/files/document/cms_cop12_res.12.7_e.pdf; accessed 7 Jan 2022. See also Resolution 9.9 (Rev.COP12) where Parties, the Scientific Council and the CMS Secretariat to identify priority 'species and habitats in the marine sphere requiring intervention by the CMS'. Available http://cms.int/sites/default/files/document/cms_cop12_res.9.9%28rev.cop12%29_e.pdf; accessed 7 Jan 2022

In the context of flyways,[325] these networks would, for instance, include breeding grounds, stop-over sites, non- breeding areas and feeding and nesting places, all of which can be included in the flyway.[326] CMS COP13 further emphasized the importance of addressing connectivity in the conservation of migratory species.[327]

Recommendations to further advance the design and implementation of ecological networks to address the needs of migratory species include guiding principles for this purpose. They also highlight that these guiding principles are a work in progress, as further research is needed on animal distributions, movement patterns and gap analyses of existing networks, all of which will influence the design of optimum ecological networks.[328] More specific criteria to identify critical habitats and sites for migratory species have been developed for taxa such as birds, marine mammals in general and marine turtles. They are discussed below together with provisions in the CMS and subsidiary instruments which apply to migratory species in the SCS.

1.4.2 Application in the SCS of the Convention on Migratory Species and other relevant instruments of the CMS family of instruments

1.4.2.1 Adoption of the Convention on Migratory Species by littoral states of the SCS

As of 1 January 2021, the CMS has 132 states parties globally, with an uneven regional representation. Whereas most states from Europe, Middle East, Africa, South America and Oceania are parties, states from North and Central America, Southeast Asia and East Asia are

[325] A flyway is for migratory birds what a migratory corridor at sea is for migratory marine mammals. According to Birdlife International, birds don't choose their path at random. They follow set routes that include suitable habitats where they can stop to rest and refuel along the way. Many different species have broadly similar routes, which have been split into eight major flyways. They include breeding and non-breeding grounds and the connecting migration routes. Available https://www.birdlife.org/worldwide/programme-additional-info/migratory-birds-and-flyways; accessed 7 Jan 2022

[326] Ibid

[327] CMS COP13 Resolution 12.26 (Rev.COP13). Available https://www.cms.int/sites/default/files/document/cms_cop13_res.12.26_rev.cop13_e.pdf; accessed 20 Jan 2022

[328] CMS COP12 Resolution 12.7, Annex. Available https://www.cms.int/en/document/role-ecological-networks-conservation-migratory-species-1; accessed 19 Mar 2022

hardly represented. In Southeast Asia, the Philippines is the only state party.[329] However, many non-party states to the Convention are party to species-specific MOU and Agreements that are applicable to species found within their jurisdiction.[330] The 2001 MOU on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA Marine Turtles MOU) is the MOU of the CMS family of instruments which has been most widely adopted by littoral states of the SCS. (Table 1.14)

Table 1.14: Status of adoption of the Convention on Migratory Species in the SCS and relevant MOUs

Littoral states of the SCS	Adoption of CMS[331]	IOSEA Marine Turtles (2001)[332]	Dugong MOU (2007)[333]	Sharks MOU (2010)[334]
Brunei Darussalam	-	-	-	-
Cambodia	-	2002	-	-
China	-	-	-	-
Indonesia	-	2005	-	-
Malaysia	-	2011	-	-
Philippines	1994	2001	2008	2010
Singapore	-	-	-	-
Thailand	-	2004	2011	-
Vietnam	-	2001	-	-

Sixty-five marine and coastal migratory species are listed in the CMS appendices with a geographic range comprising the SCS and intertidal-dependant migratory birds, including shorebirds, gulls and sterns and cranes. (Table 1.15 below; for full details of the species listed, see Appendix A to this study)

[329] See https://www.cms.int/en/parties-range-states; accessed 7 Jan 2022

[330] This possibility is expressly envisaged in Article V(2) of the Convention on Migratory Species.

[331] Adoption by ratification, accession, acceptance, approval or succession. Available http://www.cms.int/en/parties-range-states; accessed 7 Jan 2022

[332] 2001 IOSEA Marine Turtles MOU available http://www.cms.int/iosea-turtles/en/page/mou-text-cmp; accessed 7 Jan 2022

[333] 2007 MOU on the Conservation and Management of Dugongs (*Dugong dugon*) and their habitat throughout their range (2007 Dugong MOU) and its status of adoption. Available http://www.cms.int/dugong/en; accessed 7 Jan 2022

[334] 2010 MOU on the Conservation of Migratory Sharks (2010 Sharks MOU) and its status of adoption. Available http://www.cms.int/en/legalinstrument/sharks-mou; accessed 7 Jan 2022

Sensitive areas for each of those species are the critical habitats within their range and migration routes as defined in the relevant international agreement. CMS COP12 adopted a resolution to promote MPA networks and connectivity in the ASEAN Region. The resolution encourages parties and Range States to improve the

identification and governance of important sites for migratory species.

In the context of Southeast Asia, the resolution also urges relevant states to collaborate with existing region-wide networks, including the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), the Coral Triangle Initiative (CTI), the ASEAN Working Groups on National Conservation and Biodiversity (NCB), and other ASEAN programs.[335] CMS COP13 further emphasized connectivity.[336]

Table 1.15: CMS-listed taxonomic groups of species found in the SCS

Generic Common Name	Appendix 1	Appendix 2 only	MOU or Agreement applicable in the SCS
Whales, dolphins, porpoises and dugongs	6	9	Dugong MOU
Sea Turtles	5	0	IOSEA MOU
Sharks and rays	13	11	Sharks MOU
Shore birds and seabirds	9	13	-
Total	33	32	

1.4.2.2 Small Cetaceans and Dugongs

Dugongs have been listed in CMS Appendix II since 1979.[337] They span a geographic range of around 37 countries, including Southeast Asia, and

are long-lived with a low reproductive rate a high investment in each offspring, making the species vulnerable to over-exploitation.[338]

Highlighting that dugongs are listed in Appendix I of the Convention on International Trade in

[335] CMS COP12 Resolution 12.24. Available http://cms.int/sites/default/files/document/cms_cop12_res.12.24_mpa-network-asean_e.pdf; accessed 7 Jan 2022

[336] Supra note 328

[337] CMS Assessment Information on Dugong. Available http://cms.int/en/species/dugong-dugon; accessed 19 Mar 2022

[338] CMS COP7 Resolution 7.18 (Rev.COP12). Available http://cms.int/sites/default/files/document/cms_cop12_res.7.18%28rev.cop12%29_e.pdf; accessed 19 Mar 2022

Endangered Species of Wild Fauna and Flora (CITES)[339], CMS COP12 urged Range States, international organizations and NGOs to cooperate and conserve this species.[340] CMS COP12 also reiterated encouragements expressed at COP7 (2002) for a regional instrument to protect small cetaceans of Southeast Asia (other than Dugongs) also listed on CMS Appendix I and II.[341]

The 2007 MOU on the Conservation and Management of Dugongs (*Dugong dugon*) and their habitats throughout their range (Dugong MOU) has 28 signatories. Twenty Range States have not adopted it.[342] The littoral states of the SCS are all Range States. Although the Philippines and Thailand are the only signatories (as of 1 January 2021), non-party Range States can attend meetings on simple request.[343] The Dugong MOU highlights the diversity of marine and coastal habitats dugongs depend on throughout their range. It emphasises the importance of monitoring and protecting 'important dugong habitats', including seagrass beds, without defining these habitats or setting criteria to identify and prioritise them. Specific research projects devoted to different geographic areas focus on identifying the range, gathering abundance estimates, conducting population and habitat viability estimates, and assessing threats.[344]

These elements, which would form the basis for a habitat selection proposal, can also be used to inform the Dugong and Seagrass Research Toolkit developed under a grant from the GEF

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[339] Convention on International trade in Endangered Species of Wild Fauna and Flora, 3 March 1973, 993 U.N.T.S. 243, 27 U.S.T. 1087 (entered into force on 1 July 1975) [CITES]. Appendix I includes those species threatened with extinction which are or may be affected by trade. Appendix I species are under the highest level of protection under CITES. Appendix II includes (a) all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival; and (b) other species which must be subject to regulation in order that trade in specimens of certain species referred to in (a) of this paragraph may be brought under effective control.

[340] Supra note 338

[341] CMS COP12 Resolution 7.17(Rev.COP12). Available http://www.cms.int/sites/default/files/document/cms_cop12_res.7.17%28rev.cop12%29_e.pdf; accessed 19 Mar 2022

[342] Status of adoption. Available http://www.cms.int/dugong/en/signatories-range-states; accessed 19 Mar 2022

[343] For example, Malaysia and Timor-Leste attended the 3rd Dugong MOU meeting. Available http://cms.int/dugong/sites/default/files/document/cms-dugong_mos3_inf1_prov-list-participants.pdf; accessed 19 Mar 2022

[344] Report of the 3rd meeting of signatories to the Dugong MOU [para. 99]. Available http://cms.int/dugong/sites/default/files/document/cms-dugong_mos3_report_reissued2.pdf; accessed 19 Mar 2022

and announced for publication at the 3rd meeting of the parties to the Dugong MOU. It has been published by the partners since but outside the MoU website, perhaps pending the 4th meeting of the parties to the Dugong MOU.[345] This research project, which focused on dugong populations across the Indian and Pacific Ocean basins, concerns all non-signatory Range States from Southeast Asia, including the SCS littoral states.

1.4.2.3 Migratory Marine Mammals and Important Marine Mammal Areas (IMMAs)

IMMAs are defined as 'discrete portions of habitat, important to marine mammal species that have the potential to be delineated and managed for conservation'.[346] Following the development of IMMA criteria by the IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task force (the IMMA Task Force), the Aquatic Mammals Working Group of the CMS Scientific Council recommended that these criteria be enforced by CMS COP12 and integrated directly into the CMS Ecological Networks Work Programme.[347] However, the wording of CMS COP12 is more cautious as it 'acknowledges' the importance of these criteria and the identification process described in the IMMA Guidance Document. It also 'requests' parties to identify 'specific areas where the identification of IMMAs could be particularly beneficial'.[348] This resolution also encourages ongoing liaison with the IWC on using IMMAs to mitigate threats, such as ship strikes, through joint approaches by the IMO and IWC in selected IMMAs.[349]

Unless they are objected to by states parties at future COPs, these IMMA criteria may therefore

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[345] Draft programme of work (2017-2019) to support the implementation of the CMS Dugong MOU. Available http://cms.int/dugong/sites/default/files/document/cms-dugong_mos3_doc12-1_draft-pow_reissued.pdf; accessed 19 Mar 2022; See also the GEF Dugong and seagrass conservation project (CMS/Dugong/MOS3/Inf.7) for a review of the tool. Available http://www.cms.int/sites/default/files/document/cms-dugong_mos3_inf3_gef5-project.pdf; accessed 19 Mar 2022. The Toolkit is available http://www.conservation.tools/about-the-toolkit/; accessed 16 Nov 2022

[346] See definition of the Marine Mammal Protected Areas Task Force. Available https://www.marinemammalhabitat.org/activities/immas/; accessed 19 Mar 2022 and the 2021 IMMA Guidance; accessed 20 Mar 2022 ; See also Report of the Workshop for the Development of Important Marine Mammal Area (IMMA) Criteria. Available https://www.marinemammalhabitat.org/download/report-of-the-workshop-for-the-development-of-important-marine-mammal-area-imma-criteria/; accessed 19 Mar 2022

[347] 1st Meeting of the Sessional Committee of the CMS Scientific Council. Available http://www.cms.int/sites/default/files/document/cms_scc-sc1_doc-10-4-2-1_immas_e.pdf; accessed 31 Jan 2022

[348] CMS COP12 Resolution 12.13. Available http://cms.int/sites/default/files/document/cms_cop12_res.12.13_immas_e.pdf; accessed 31 Jan 2022

[349] Ibid

become *de facto* criteria for the implementation of CMS instruments that relate to marine mammals. The IMMA Task Force identified IMMAs through regional workshops organised from 2016 to 2022. The Northeast Indian Ocean and Southeast Asian Seas workshop, held on 12-16 March 2018 in Kota Kinabalu, proposed 46 new candidate IMMAs.[350]

The SCS was been identified in a survey by the Department of the Environment, Heritage and the Arts of the Australian Government as a 'hot spot' area that simultaneously provides habitat for numerous threatened species, subspecies and populations of marine mammals and as such could serve as the basis for future internationally coordinated conservation action.[351]

1.4.2.4 Sea turtles in Southeast Asia: Development of a Network of Sites of Importance

Marine turtles have been listed on Appendix I and II of the CMS since 1985 or earlier, depending on the species.[352] A separate MOU is in place for marine turtles in the Atlantic and for marine turtles in the Indian Ocean/Southeast Asian Seas, respectively. Discussions on the identification of critical habitats for the species covered by these MOUs have taken place within these fora.

Adopted in 2001, the IOSEA Marine Turtle MOU has 35 signatory states, including six of the nine littoral states of the SCS. (Table 1.14) Only nine out of 44 Range States have not signed, which makes it a relatively successful CMS MOU.[353] The objective of the MOU is to 'protect, conserve, replenish and recover marine turtles and their habitats, based on the best scientific evidence'.[354]

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[350] For the meeting, see https://www.marinemammalhabitat.org/immas/workshops/north-east-indian-region/. For the report, see also 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/; accessed 31 Jan 2022

[351] Australian Government, Department of the Environment, Heritage and the Arts, Global Conservation and Values – Global Cetacean Summary Report, 2009, Canberra, Australia [5]. Available http://www.cms.int/sites/default/files/document/BackgroundPaper_AUS_GlobalCetaceanSummaryReport_0.pdf; accessed 31 Jan 2022

[352] Only the loggerhead, hawksbill and Ridley turtles were listed on Appendix I in 1985. All the others were listed on Appendix I and II in 1979. They are now all listed on Appendix I. Available http://www.cms.int/en/species; accessed 1Feb 2022. Membership available here: https://www.cms.int/iosea-turtles/en/about/membership; accessed 1Feb 2022

[353] http://www.cms.int/en/legalinstrument/iosea-marine-turtles; accessed 1Feb 2022

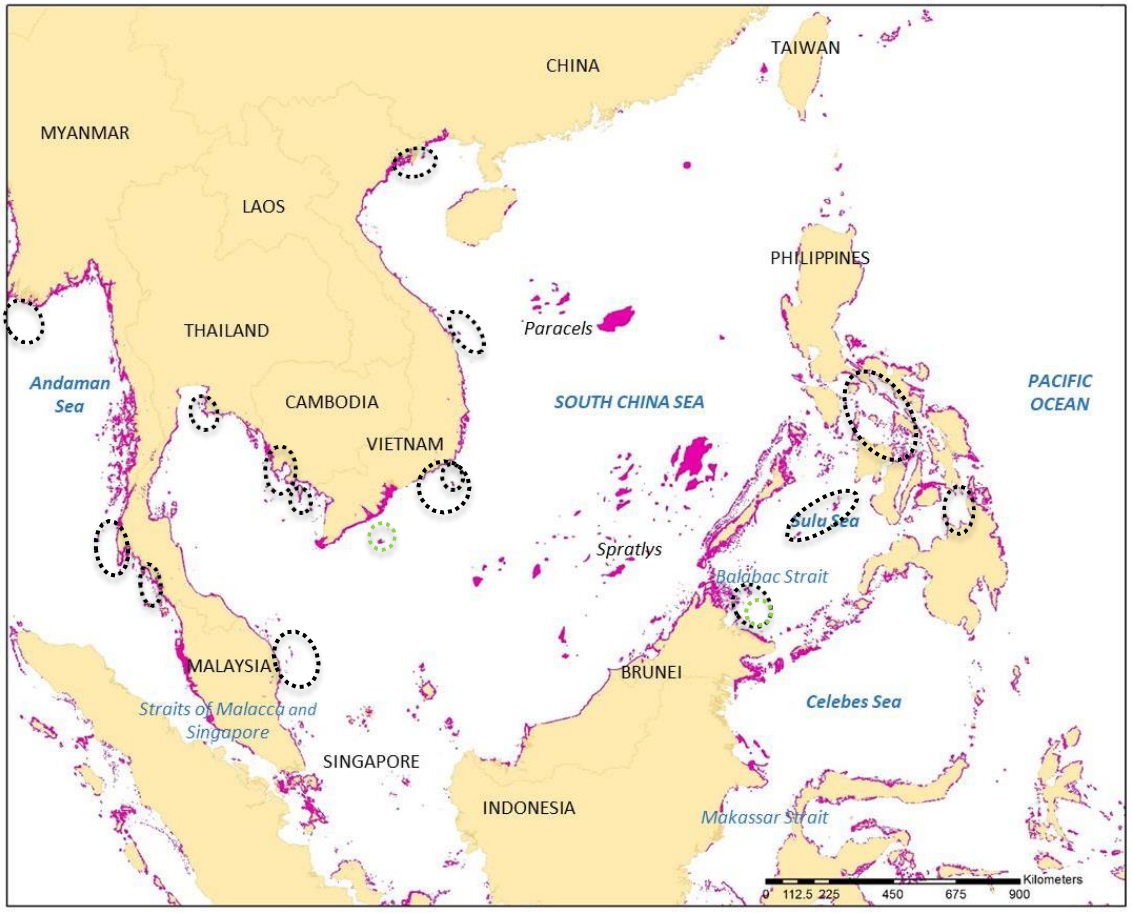
[354] IOSEA Marine Turtle MOU, Objective

[355] CMS COP11 Resolution 11.25 Advancing ecological networks to address the needs of migratory species. Available http://www.cms.int/sites/default/files/publication/cms_cop11_proceedings_e.pdf; accessed 1 Feb 2022 CMS COP12 Resolution12.7, supra note 329

The IOSEA Marine Turtle MOU defines 'Habitat' as

> all those aquatic and terrestrial environments which marine turtles use at any stage of their life cycles.

Parties to the IOSEA Marine Turtle MOU adopted the IOSEA Network of Sites of Importance for Marine Turtles based on evaluation criteria acknowledged by CMS COP11 (in 2014) and CMS COP 12 (in 2017), in their resolutions on ecological networks.[355] The Conservation and Management Plan included in the MOU indicates that the identification of critical habitats such as migratory corridors, nesting beaches, inter-nesting and feeding areas as one of the action



Map 1.4: Areas where IOSEA network sites are proposed in and around the South China Sea (Sites marked in green have been approved. Indicative location for illustration purposes. To be visible at this scale, areas had to be enlarged)

items.[356] However, it included no guidance for prioritisation among these sites.

Signatory States to the MOU developed evaluation criteria[357] to determine whether individual proposals attain a minimum benchmark score, select sites of importance and create a Network of Sites of Importance for Marine Turtles.[358] Ten sites have also been designated, two of which are in Southeast Asia, off Tawi Tawi, in the Philippines,[359] and off Con Dao Island, Vietnam, in the SCS.[360] More than 100 sites are being considered for inclusion at a later stage, some of which are in the SCS (off peninsular Malaysia, coastal Vietnam and in the Gulf of Thailand, see Figure 1.4 below). Marine turtle nesting sites in the Spratly area are also mentioned.[361] The 2019 Meeting of the Signatory States discussed the

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[356] Ibid, Objective 2.1(a)

[357] Criteria for the Evaluation of Nominations to the Network of Sites of Importance for Marine Turtles in the Indian Ocean-Southeast Asia Region, 19 July 2013, Secretariat of the Indian Ocean – Southeast Asia Marine Turtle MOU. Available https://www.cms.int/iosea-turtles/sites/default/files/basic_page_documents/Site_Network-Evaluation_Criteria-ENGLISH-REV-190713.pdf; and Resolution https://www.cbd.int/doc/meetings/mar/ebsa-sio-01/other/ebsa-sio-01-iosea-02-en.pdf; accessed 1 Feb 2022

[358] Report of the 7th meeting of IOSEA Signatory States, 8-11 September 2014 [8-13]. Available http://www.cms.int/iosea-turtles/sites/default/files/document/CMS_IOSEA%20SS7_MR-1_Meeting%20REPORT%20including%20annexes.pdf; accessed 1 Feb 2022

[359] Ibid [para. 77]. This site includes six islands (Baguan, Taganak, Lihiman, Langaan, Great Bakkungan and Boan). Importantly, Philippines and Malaysia agreed on a Memorandum of Agreement on the establishment of the Turtle Island Heritage Protected Area on 31 May 1996 for green and hawksbill sea turtles. This Park includes these six islands as well as the three islands of Selingaan, Gulisaan and Little Bakkungan/Bakkungaan Kechil, under the control of Malaysia. Available http://www.officialgazette.gov.ph/1996/05/31/the-philippine-claim-to-a-portion-of-north-borneo-memorandum-of-agreement-between-the-government-of-the-republic-of-the-philippines-and-the-government-of-malaysia-on-the-establishment-of-the-turtle-i/; accessed 1 Feb 2022

[360] See the report of the 8th Meeting of the IOSEA Signatory States section 9, para.124 and Vietnam's proposal that was endorsed, especially the map on page 13. Available https://www.cms.int/iosea-turtles/sites/default/files/document/IOSEA_MOS8_Report_final.pdf (report) and https://www.cms.int/iosea-turtles/sites/default/files/document/cms_iosea_mos8_doc.9.2_proposal-site-network-con-dao_e.pdf (proposal); accessed 1 Feb 2022

[361] The sites proposed are located in Cambodia (in Sihanoukville and Kampot province), Indonesia (Raja Ampat region and Aru Islands, Derawan Archipelago (Berau Islands), Pulau Sangalaki and Pulau Sammana) as well as the Lucipara cluster in the Banda Sea), Malaysia (Terengganu and Pahang States) including Turtles islands that spans over to the Philippines, the Philippines (Tubbataha-Cagayan ridge, Bastera and Beazley reefs as well as 30 other specific nesting sites including Batangas and Negros Occidental), Thailand (Kram Island and Kra Island in the Gulf of Thailand) and Vietnam (Con Dao Islands (14 sites), Nui Chua (Ninh Thuan), Quang Ninh to Kien Giang coastal areas, including Vinh Thuc Island, Minh Chau Beach, Bach Long Vy Island (Hai Phong), Phu Quy Island and Hon Gam-Ba Lang reefs). IOSEA Marine Turtle MOU 7th Meeting of the Signatory States, Network of Sites of Importance for Marine Turtle, 1 September 2014. MT-IOSEA/SS.7/Doc.7 Agenda item 8a [17-20]. Available https://www.cms.int/iosea-turtles/sites/default/files/document/CMS_IOSEA_SS7_Doc.%2007_Network%20of%20Sites%20of%20Importance%20for%20Marine%20Turtles.pdf; accessed 1 Feb 2022

progress and agreed to the review of proposals being continued intersessionally for adoption through a silent procedure ahead of the next Meeting of the Signatory States in 2022.

Signatory States also observed that

> consideration may also be given to further defining the main goals and the role of the IOSEA Site Network as well as its relationship with existing sites of importance, such as Ramsar and UNESCO.[362]

This observation shows the awareness of the parallel processes and developing efforts of states to avoid duplication and ensure coherence. This is further discussed in Chapters 4 and 6 in the context of interactions between regimes and in the context of the implementation of UNCLOS.

1.4.2.5 Sharks and Rays

The protection of migratory sharks and rays is the subject of CMS COP11 Resolution 11.20 where states are requested, among other measures, 'to identify and conserve critical habitats and life stages, and migration routes' and encouraged 'to minimize the impact of fishing in migration corridors and other habitats deemed critical to the recovery and sustainability of shark and rays populations'.[363] Other relevant instruments of international law are also referred to (such as the UNGA Resolutions on fisheries, FAO's International Plan of Action for Sharks, and CITES) and states are urged to implement them.

CMS states parties are also invited to sign the CMS MOU on the Conservation of Migratory of Sharks (12 February 2010, further amended in February 2016 - the Shark MOU), [364] which applies to listed shark species in the CMS, including rays.[365] The MOU has so far been signed by

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[362] Report CMS/IOSEA/MOS8/Doc.9.1, supra note 361

[363] CMS COP Recommendation 8.16 (2005) called for the development of a global migratory shark conservation instrument. Available http://www.cms.int/sites/default/files/document/CP8Rec_8_16_Migratory_Sharks_E_0.pdf; accessed 1 Feb 2022; CMS COP12 Resolution 11.20. Available http://www.cms.int/sites/default/files/document/Res_11_20_Conservation_Sharks_and_Rays_E.pdf; accessed 1 Feb 2022

[364] CMS COP12 Resolution 11.20, ibid [para. 12]

[365] MOU on the Conservation of Migratory Sharks. Available http://www.cms.int/sharks/en/page/sharks-mou-text; accessed 1 Feb2022

48 states. However, 105 Range States have yet to sign.[366] Whereas all littoral states of the SCS are Range States, only the Philippines has signed the Shark MOU.

The Conservation Plan of the Shark MOU includes the compilation of data including 'shark habitats', 'aggregations' and 'the seasonal spatial migration patterns and routes of sharks' and the identification and prioritisation

> (with a view to developing conservation measures) [of] critical shark habitats including critical migration routes.[367]

The parties have met three times since 2010. Protection of critical habitats and of corridors for corridor life stages is mentioned in the report of the second meeting (2016). However, there is no mention of more specific criteria to identify which, among the habitats, are 'critical enough' and should therefore benefit from a greater degree of protection. The study commissioned by the Advisory Committee on 'conservation priorities for shark and ray species' proposes a habitat classification methodology based on scientific criteria. It highlights a distinction between species that are coastal inhabitants with those that are more pelagic and insists on nursery areas as among the most important essential habitats. [368] This work appears to be still on-going.[369]

1.4.2.6 Marine Important Bird and Biodiversity Areas (IBAs) and flyways

With respect to migratory bird flyways, no set of general and scientific criteria has yet been legally established by CMS instruments. The Flyways Working Group of the CMS Scientific Council released three global reviews which include an analysis of existing mechanisms, discussion and recommendations for the identification of critical habitats. These will be taken into account in the CMS Programme of Work on Migratory Birds and Flyways 2014-2023 which includes the

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[366] Signatories and Range States available http://www.cms.int/sharks/en/signatories-range-states; accessed 1 Feb2022

[367] Ibid

[368] DA Ebert (2015) Study and Conservation for Sharks and Ray Species included and proposed for inclusion in Annex I to the CMS MOU on the Conservation of Migratory Sharks (date unconfirmed) [23-26]. CMS/Sharks/MOS/Inf.12. Available https://www.cms.int/sharks/en/mos2; accessed 1 Feb 2022

[369] See Report of the third Meeting of the Signatories on 10-14 December 2018 and of the 2019-2021 Programme of Work. Available https://www.cms.int/sharks/en/documents/mos-outcomes; accessed 1 Feb 2022

identification and designation of critical sites.[370] The reviews endorse and discuss criteria developed under the Ramsar Convention, as well as three specialised initiatives[371]: the identification of Important Bird and Biodiversity Areas (IBAs) and Marine IBAs by the NGO BirdLife International,[372] the critical sites network developed under the Wings Over Wetlands (WOW) UNEP-GEF African-Eurasian Flyways Project, and the EAAFP.[373]

The scientific criteria used by these different initiatives are described in Appendix B below. The CMS Review of Migratory Bird Flyways and Priorities for Management highlights the need for an agreement for Southeast Asia (among other regions), mentioning different regional bodies which could be involved.[374] The EAAFP[375] which was agreed outside the CMS Family of Instruments, covers all CMS Appendix I-listed bird species with habitat in the SCS.[376] All nine littoral states of the SCS participate in this Flyway partnership.[377] This partnership works on the basis of voluntary submissions of sites by participating states. The information form to be

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[370] CMS COP12 Resolution 12.11, Annex 1. Available http://www.cms.int/sites/default/files/document/cms_cop12_res.12.11_annex1_pow-2014-2023_e.pdf; accessed 1 Feb 2022

[371] A review of migratory bird flyways and priorities for management, CMS Technical Series Publication No.27, 2014, UNEP/CMS Secretariat, Bonn – Germany [70]. Available http://cms.int/sites/default/files/publication/CMS_Flyways_Reviews_Web.pdf; accessed 1 Feb 2022

[372] Marine IBA e-atlas available https://maps.birdlife.org/marineIBAs/; accessed 1 Feb 2022. It is based on standardised techniques for identifying priority sites for the conservation of seabirds at sea. Available http://datazone.birdlife.org/userfiles/file/Marine/Marinetoolkitnew.pdf; accessed 1 Feb 2022. This refers to Ramsar Criterion A4 which aims to identify congregations of birds, as well as to other initiatives. CMS Scientific Council Flyways Working Group Review 2, 11 April 2011 [130], ibid

[373] Critical site identification method of WOW. See Wings Over Wetlands UNEP/GEF African-Eurasian Flyways Project (2011) The Critical Site Network: Conservation of internationally important sites for waterbirds in the African-Eurasian Waterbirds Agreement area. Wetlands International. Ede, The Netherlands and BirdLife International, Cambridge, UK. Available http://www.eaaflyway.net/documents/resources/Critical_Site_Network.pdf; accessed 1 Feb 2022; Site network of the East Asian-Australasian Flyway Partnership (EAAFP. Available https://www.eaaflyway.net/the-flyway/flyway-site-network/; accessed 1 Feb 2022

[374] CMS Technical Series No.27 [155-156]. Available http://cms.int/sites/default/files/publication/CMS_Flyways_Reviews_Web.pdf; accessed 1 Feb 2022

[375] See supra note 374

[376] Only two of the CMS Appendix II-listed species are included as key species of the partnership. List of key species available http://www.eaaflyway.net/migratory-waterbirds-in-eaaf/key-species-of-eaafp/; accessed 1 Feb 2022

[377] The Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian-Australasian Flyway is an initiative that resulted from the 2002 World Summit on Sustainable Development in Johannesburg. It includes 22 countries, international organisations and non-governmental organisations. Its first objective is to 'develop the Flyway Network of sites of international importance for the conservation of migratory waterbirds, building on the achievements of the Asia-Pacific Migratory Waterbird Conservation Committee, the Asia-Pacific Migratory Waterbird Conservation Strategy (APMWCS) networks. Available https://eaaflyway.net/wp-content/uploads/2017/11/Partnership-document-v15.pdf; accessed 1 Feb 2022

submitted when nominating a site includes scientific criteria adapted from practices adopted under the Ramsar Convention, with respect to wetlands of international importance, and for the purpose of identifying IBAs, with respect to congregations, albeit with lower thresholds.

Despite the EAAFP not being a CMS instrument, CMS COP9 welcomed its establishment and recognised that the Partnership fulfils the conditions of a non-binding agreement under the Convention on Migratory Species.[378]

1.4.3 Scientific criteria

Although no generic scientific criteria have been developed by CMS COP to streamline the identification process of critical and essential habitats for listed migratory species, the importance of states parties proceeding with such identification is highlighted in most COP reports. COP 11 and COP 12 even adopted resolutions for further advancing the design and implementation of ecological networks to address the needs of migratory species and which provide the following guidance:

- Defining network objectives
- Ensuring that networks have a sufficiently holistic scope
- Ensuring the functional benefits of connectivity
- Other design factors such as particular migratory patterns and use of critical sites
- Assessing risks
- Knowledge and engagement
- The implementation regime.[379]

Such networks must be sufficient to address the needs of migratory species throughout their life cycles and migratory ranges.[380] However, CMS COP welcomes numerous network creations, although they may rely on different criteria, provided they are 'scientifically robust criteria'; a good example is the different flyways which rely on similar but different criteria (Appendix B). In addition to

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[378] Convention on Migratory Species Article IV(4). CMS COP9 Resolution 9.2 Annex VIII. Available http://www.cms.int/sites/default/files/document/Res_9_02_CMS_Agreement_Priotirties_En.pdf; accessed 1 Feb 2022

[379] CMS COP12 Resolution 12.7, supra note 329

[380] Ibid [para. 8]

flyway criteria, two sets of scientific criteria are particularly relevant to the SCS: criteria developed to identify IMMAs (Table 1.16)[381] and criteria developed for the inclusion of critical sites in the IOSEA Marine Turtle Site Network (Table 1.17).[382]

Table 1.16: Scientific criteria to identify International Marine Mammals Areas

#	Criterion[383]	Sub-criterion		Description
1	A	Species or population vulnerability	-	Areas containing habitat important for the survival and recovery of threatened and declining species
2.1	B(i)	Distribution and Abundance	Small and Resident Populations	Areas supporting at least one resident population, containing an important proportion of that species or population, that are occupied consistently
2.2	B(ii)		Aggregations	Areas with underlying qualities that support important concentrations of a species or population
3.1	C(i)	Key Life Cycle Activities	Reproductive Areas	Areas that are important for a species or population to mate, give birth, and/or care for young until weaning
3.2	C(ii)		Feeding Areas	Areas and conditions that provide an important nutritional base on which a species or population depends
3.3	C(iii)		Migration Routes	Areas used for important migration or other movements, often connecting distinct life-cycle areas or the different parts of the year-round range of a non-migratory population
4.1	D(i)	Special Attributes	Distinctiveness	Areas which sustain populations with important genetic, behavioural or ecologically distinctive characteristics
4.2	D(ii)		Diversity	Areas containing habitat that supports an important diversity of marine mammal species

Although IMMA criteria and identification processes were developed by the IUCN outside the mandate of an international instrument for the protection of marine mammals, they are, in effect, endorsed by CMS COP12 which requires parties to apply them. Their authority also results from their being designed by the IUCN based on a robust and iterative scientific methodology, tested regionally, and improved to reflect the lessons learned. They are also the only existing set of criteria developed for marine mammals globally and are likely to remain so. They would therefore be a likely guide for any effort to identify critical habitats of migratory

[381] Table 1.16 is based on IMMA criteria. Available https://www.marinemammalhabitat.org/immas/imma-criteria/; accessed 19 Mar 2022

[382] Table 1.17 is based on the IOSEA Marine Turtle Network Criteria, supra note 358

[383] https://www.marinemammalhabitat.org/activities/immas/imma-criteria/; accessed 1 Feb 2022

marine mammals in the SCS, or set custom criteria for this purpose, should adequate scientific data be first gathered. Given their general wording, the IMMA criteria could also provide a useful starting point for migrating sharks and rays in the SCS.

By contrast, the criteria developed to identify critical sites in the IOSEA Marine Turtle Site Network and adopted by the Signatory States are not limited to biological and ecological criteria related to the species. They also include governance, socio-economic, political and network-wide ecological criteria. Based on the relative value given to different criteria, this methodology results in non-ecological criteria being considered on a near-equal footing with ecological criteria; non-ecological criteria add up to 72 points and ecological criteria add up to 89 points. A minimum overall value of 75 points is required for a site to qualify (including ecological and non-ecological criteria).[384]

Table 1.17: Criteria for inclusion in the IOSEA Marine Turtle Site Network

#	Criterion	Category	Criterion	Description	Value[385]
1.1	EB1a	Ecological and Biological Criteria (EB)	Abundance at nesting sites	Number of marine turtles constituting a management unit, the size of which is considered to be of regional importance	15
1.2	EB1b		Abundance at foraging sites	Number of marine turtles (of any species) foraging at a site, which is considered to be of regional importance	15
1.3	EB2		Species or management unit richness	Number of species or marine turtle management units (if known) regularly using a site's nesting habitat or foraging habitat	15
1.4	EB3		Presence of rare marine turtle species	Presence of a marine turtle species that is considered rare in the IOSEA region	12
1.5	EB4		Resistance and resilience	Site containing habitat of importance to marine turtles that is Likely to be relatively resistant and/or resilient to disturbance	8
		Total value			65 (18)
2.1	G1	Governance Criteria (G)	Legal framework	Provides adequate protection of the site and of the life stage(s) of the marine turtle population found at the site	8
2.2	G2		Conservation actions	Conservation interventions have been undertaken to mitigate known threats to marine turtles identified at the site	10
2.3	G3		Collaborative management, surveillance and enforcement	Participatory work with local stakeholders to strengthen local stewardship of marine turtles, and/or to provide for adequate surveillance and enforcement of prevailing regulations	8

[384] Supra note 359

[385] This column indicates the maximum assessment value for each criterion, the maximum assessment value for each category (total value) as well as the minimum value required (in brackets)

#	Criterion	Category	Criterion	Description	Value[385]
2.4	G4		Research and monitoring	Site is currently used to monitor marine turtle abundance or other critical parameters and/or has marine turtle surveys with standardised data that span > 15 years for the site and/or survey data are used to estimate trends in the size of management units	8
2.5	G5		Sustainable human and financial resources	Availability of long-term resources (human and financial) to enable effective governance activities, including monitoring, management interventions, surveillance and enforcement, and performance evaluation.	8
		Total value			42(20)
3.1	S1	Socio-economic and Political Criteria (S)	Cultural importance	Site contains prehistoric, historic, and/or contemporary resources, or embodies non-consumptive traditional beliefs/practices of cultural, religious and/or spiritual significance, in relation to marine turtles	6
3.2	S2		Compatible activities	Activities occurring within the vicinity of the site that are compatible with the conservation of marine turtles and their habitats	
3.3	S3		Educational values	Existence of actual, or future opportunities for, educational and outreach activities, by virtue of the site's location and other inherent characteristics	6
3.4	S4		Existing recognition	Length of existing protected status or other national, regional or international recognition for the site's value to marine turtles	6
3.5	S5		National significance	Significance of the site in a national context, relative to other sites	6
3.6	S6		Perceived ancillary benefits from site inclusion in the network	e.g. for other biodiversity/local communities associated with the site, or other related conservation initiatives	6
		Total value			30(15)
4.1	N1	Network-wide Ecological Criteria	Representativeness and replication	Site contributes to the network's: (i) adequate representation of the full range of habitat diversity required for the maintenance of marine turtle management units and species of the IOSEA region (representativeness), and/or (ii) inclusion of multiple sites containing identical habitat types (replication)	4
4.2	N2		Ecological connectivity	Site contributes to protecting functional links among areas of marine turtle habitat	8
4.3	N3		Area	Area of a site or combined area of functionally-linked sites contributes to protecting the area of marine turtle habitat needed	12
		Total value			24(10)

The use of language in the EBSA criteria suggests an overlap between the identification of sensitive marine areas under the CMS and some EBSA identification criteria which would apply to critical habitats of threatened or endangered migratory species:

- EBSA Criterion 2 on areas with a special importance for the life history of species, i.e.

areas required for a population to survive and thrive;

- EBSA Criterion 3 on the importance of an area for threatened, endangered or declining species and/or habitats;
- EBSA Criterion 4 on vulnerability, fragility, sensitivity or slow recovery;
- EBSA Criterion 6 on biological diversity.[386]

A similar overlap exists between the identification of sensitive marine areas under the CMS and the identification of Ramsar Sites that are critical for migratory birds, which is why Ramsar Sites criteria are used in the development of flyways sites. The same can be said for other endangered migratory species which rely on coastal wetlands for survival.[387]

1.4.4 Listing procedure and status

Whereas the listing of species on Appendix I and II is debated at CMS COPs, the identification of specific critical or essential habitat sites is discussed in the specialised meetings of MOUs, other CMS agreements and other species-specific programmes, initiatives and working groups. Therefore, no procedure is developed under the CMS for the listing of critical and essential habitats or for a central repository. However, such procedures can be developed in the context of MOUs and other species-specific agreements. For example, a procedure is under development for the implementation of the IOSEA Marine Turtle MOU encompassing a web-based interface with a site repository which includes information sheets.[388]

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[386] Consistent with the analysis in the Global Ocean Biodiversity Initiative (GOBI)'s Report to the CMS: CY Kot et al (2014) A Review of Marine Migratory Species and the information Used to Describe Ecologically or Biologically Significant Areas (EBSAs), UNEP/CMS/COP11/Inf23. Available http://www.cms.int/en/meeting/eleventh-meeting-conference-parties-cms; accessed 1 Feb 2022

[387] CMS COP12 adopted a resolution 12.25 promoting conservation of critical intertidal and other coastal habitats for migratory species and highlights the importance of the CBD and the Ramsar Convention. Available http://www.cms.int/sites/default/files/document/cms_cop12_res.12.25_conservation-intertidal-coastal-habitats_e.pdf; accessed 1 Feb 2022. Similarly, the 8th Meeting of the Signatories of the IOSEA Marine Turtles MOU highlighted Ramsar Resolution XIII.24 on Marine Turtles and recommended to the COP to strengthen synergies and collaboration with the Ramsar Convention and to include relevant activities in the draft IOSEA Marine Turtle MOU Work programme is necessary. Available https://www.cms.int/iosea-turtles/sites/default/files/document/cms_iosea_mos8_doc.10.2_ramsar-resolution-collaboration_e.pdf; accessed 1 Feb 2022

[388] Supra note 362

1.4.5 Reporting, monitoring and review process

CMS COP11 adopted an intersessional process to explore possibilities for strengthening implementation of the Convention through the development of a review process. The Terms of Reference of the Working Group on the Development of a Review Process include a comparative analysis of existing review mechanisms of international environmental instruments, including CMS instruments, and grant the responsibility for the review process to an existing CMS body.[389] The extent to which this review would include critical site selection is unclear. Meanwhile, reporting, site monitoring and review are provided for in most CMS Agreements and MOUs, including the Conservation and Management Plan of the IOSEA Marine Turtles MOU.[390] Reporting, monitoring and review are important components of the meetings of the Signatory States.

1.4.6 Expected management measures

In addition to the general obligation of conservation, the CMS includes a clear obligation for Range States of Appendix I to 'prohibit the taking' of animals from these species. Exceptions may be made in extraordinary circumstances or if the taking is:

- for a scientific purpose;
- for the purpose of enhancing the propagation or survival; or
- to accommodate the needs of traditional subsistence users.[391]

The Convention also includes, albeit in less imperative language as the obligation is applicable 'where feasible and appropriate' or 'as appropriate',[392] an obligations, with respect to CMS Appendix I species, to:

- restore habitats that are important to remove the species from danger of extinction
- prevent, remove, compensate for or minimize the effects of activities or obstacles that

[389] CMS COP11 Resolution 11.7. Available http://www.cms.int/en/workinggroup/development-review-process-under-convention-migratory-species; accessed 1 Feb 2022

[390] CMS IOSEA Marine Turtles MOU and 7th meeting report of IOSEA Signatory States, supra note 359

[391] Convention on Migratory Species Article III(5)

[392] The obligation is applicable 'where feasible and appropriate' or 'as appropriate'. Convention on Migratory Species Article III(4)

impede migration

- reduce or control factors that are endangering or may further endanger these species, such as the introduction of foreign species.

With respect to Appendix II species, the Convention provides for maintenance of a network of suitable habitats "appropriately disposed in relation to the migration routes".[393] Species-specific management measures are also included in CMS MOUs and Agreements and associated reports and recommendations.[394]

However, like for the obligation contained in the CBD, no reference is made, in the text of the Convention or in the text of the many implementing instruments, to the unqualified obligation contained in UNCLOS, despite it being also applicable. (See Chapter I Section 1.1.1 above and Chapter 6 below for further discussion)

1.5 ASEAN Declarations and Guidance Documents

1.5.1 The 2003 ASEAN Declaration on Heritage Parks

The terms in the Declaration on Heritage Parks and Reserves signed by ASEAN states in 1984 were reiterated and replaced by the 2003 ASEAN Declaration on Heritage Parks and Reserves signed on 18 December 2003. [395] Parties to the latter Declaration include Cambodia, Lao PDR, Myanmar and Vietnam, which were not members of the ASEAN in 1984.[396]

Its preamble also takes note of developments in international marine environmental law and policy, especially with respect to the conservation of biodiversity, by mentioning the targets of reducing losses in biodiversity set by the 2002 World Summit on Sustainable Development and in situ conservation provisions in the CBD. It also refers to the 'uniqueness, diversity and outstanding values of certain national protected areas of ASEAN member countries' using the

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[393] Convention on Migratory Species Article V(5). See also COP13 Resolution 12.26 (rev. COP13), supra note 328

[394] See for example the local and applied recommendations of the 2nd meeting of the Working Group on the Development of a Review Process under the Convention on Migratory Species. Available https://www.cms.int/en/workinggroup/development-review-process-under-convention-migratory-species; accessed 13 Mar 2022

[395] 2003 ASEAN Declaration on Heritage Parks and Reserves, signed on 18 December 2003. Available https://cil.nus.edu.sg/databasecil/2003-asean-declaration-on-heritage-parks/; accessed 2 Feb 2022; on the history of the 1984 Declaration, see HD Vu (2013) Towards a Network of Marine Protected Areas in the SCS: Legal and Political Perspective, Dalhousie University [204-205]. Available https://dalspace.library.dal.ca/bitstream/handle/10222/31425/Vu-Hai%20Dang-JSD-Law-July-2013.pdf?sequence=1; accessed 2 Feb 2022.

[396] Six ASEAN Member States signed the 1984 Declaration: Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore and Thailand. ASEAN Centre for Biodiversity (2010) The ASEAN Heritage Parks. A Journey to the Natural Wonders of Southeast Asia. Los Banos, Laguna, Philippines [1]

language of the World Heritage Convention on areas of OUV. It further recognizes that

> conservation areas should be managed to maintain ecological processes and life support systems, preserve genetic diversity, ensure sustainable utilization of species and ecosystems; and maintain wilderness that represent scenic, cultural, educational, research, recreational and tourism values.

In this 2003 Declaration, ASEAN states agreed that 'common cooperation is necessary to conserve and manage ASEAN Heritage Parks' and designated 26 ASEAN Heritage Parks listed in Appendix I to the Declaration.[397] This list, which includes mostly terrestrial sites, can be amended from time to time by written notification from the member country concerned to the ASEAN Secretariat. Amendments must be based on a set of criteria developed by the ASEAN Senior Officials on the Environment.

Table 1.18: Criteria for nomination of new ASEAN Heritage Parks (including those for marine Heritage Parks [398]

#	Criteria (Cumulative)	Description
1	Ecological completeness	'Wholesome' or intact ecological processes and capability to regenerate with minimal human intervention
2	Representativeness	Embodies the variety of ecosystems or species representing or typical of ASEAN region
3	Naturalness	In natural condition such as a second-growth forest or a rescued coral reef formation, with natural processes still going on
4	High conservation importance	Has global significance for the conservation of important or valuable species, ecosystems or genetic resources (…) evokes respect for nature when people see it, as well as feeling of loss when its natural condition is lost
5	Legally gazetted area	Must be identified, defined and allocated by law or any legally accepted instrument of member states; used primarily as protected areas with well-defined boundaries
6	Approved management plan	Must have a management plan duly approved by national authorities
#	Additional (optional) criteria	
7	Transboundary	May play a role in nutrients, materials or support for species (especially migratory ones) to the region as a whole
8	Uniqueness	May possess special features that could not be seen in any other site
9	High ethnobiological Significance	May demonstrate harmonious relationships between culture and ecology
10	Important for endangered or precious biodiversity	Could be habitat of importance for endangered flora and fauna

[397] 2003 ASEAN Declaration on Heritage Parks and Reserves, supra note 395

[398] The table is based on the ASEAN Heritage Park Factsheet, the 2002 ASEAN Criteria for Marine Heritage Areas and the ASEAN Centre for Biodiversity (2010), infra note 400

New sites have since been added to the list, based on the 2002 ASEAN Criteria for Marine Heritage Areas[398] and another set of general criteria developed for nomination assessed by the ASEAN Centre for Biodiversity (ACB) which serves as the secretariat of the ASEAN Heritage Parks Programme. Nomination of new sites follows a review by all ASEAN Member States.[399] (Table 1.18) The Heritage Park Declaration provides a mechanism to select, among existing protected areas, those which may be granted an ASEAN status. The Declaration was conceived as a cooperation mechanism rather than a means to create a comprehensive regional network to protect biodiversity in Southeast Asia.[401]

As of July 2021, there are 48 ASEAN Heritage Parks, 11 of which are marine and coastal sites:

- Kepulauan Seribu National Park (Thousand Islands - Java Sea), Wakatobi National Park in Indonesia (Sulu Sulawesi), and Way Kampas National Park (wetland area in southeast Sumatra);
- Lampi Marine National Park in Myanmar;
- Tubbataha Reefs National Park in the Philippines (Sulu Sea);
- Ao Phang-Nga-Mu Ko Surin-Mu Ko Similan National Park (Andaman Sea), Tarutao National Park and Hat Chao Mai – Mu Koh Libong (Andaman Sea), as well as Mu Ko Ang Thong (Gulf of Thailand) in Thailand;
- Sungei Buloh Wetland (Johor Strait) in Singapore;

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[399] 2002 ASEAN Criteria for Marine Heritage Areas, Vientiane 20 November 2002. Available https://cil.nus.edu.sg/wp-content/uploads/formidable/18/2002-ASEAN-Criteria-for-Marine-Heritage-Areas.pdf; accessed 2 Feb 2022

[400] See ASEAN Criteria for Marine Heritage Areas and ASEAN Heritage Park Factsheet. Available http://www.nas.gov.sg/archivesonline/data/pdfdoc/20111026002/factsheet-_asean_heritage_parks.pdf; accessed 2 Feb 2022. See also ASEAN Centre for Biodiversity (2010) The ASEAN Heritage Parks. A Journey to the Natural Wonders of Southeast Asia. Los Banos, Laguna, Philippines [2-3]

[401] ASEAN Heritage Parks and Reserves (1988) Japan International Cooperation Agency and United Nations Environment Programme [4]. Available https://www.google.com/search?q=ASEAN+Heritage+Parks+and+Reserves+(1988)+Japan+International+Cooperation+Agency+and+United+Nations+Environment+Programme&oq=ASEAN+Heritage+Parks+and+Reserves+(1988)+Japan+International+Cooperation+Agency+and+United+Nations+Environment+Programme&aqs=chrome..69i57.1176j0j4&sourceid=chrome&ie=UTF-8#; accessed 2 Feb 2022

- Bai Tu Long National Park (Gulf of Tonkin) in Vietnam. [402]

Thus, only one of the ASEAN Heritage Parks is in the main part of the SCS, that is Bai Tu Long National Park, in Vietnam. In 2019, Thailand also nominated Mu Ko Ang Thong Marine National Park, in the north western part of the Gulf of Thailand.[403]

The Declaration also states that a master plan must be drawn up for each heritage park which shall include but not be limited to management guidelines, research on structure and function of ecosystems and education on wilderness values.

There are no monitoring or reporting provisions in the Declaration. However, country reports on the environment can provide reporting elements.

1.5.2 The 2002 ASEAN Criteria for National Marine Protected Areas

At the 21 November 2002 meeting in Vientiane, ASEAN Ministers for the Environment also endorsed, in addition to the ASEAN Criteria for Marine Heritage Areas, ASEAN Criteria for National Marine Protected Areas. [404] According to the Press Release of this ASEAN meeting, these criteria are designed to apply to new protected areas and to ensure concerted national action to protect the shared marine waters of ASEAN.

The criteria are divided into five categories in the following order: social, economic, ecological, regional and pragmatic. The criteria are set out in Table 1.19. These criteria are drafted as guiding criteria for the selection by states of an area to establish an MPA. In the case of several competing candidate areas, each criterion can be applied and given a rating and the total rating can guide prioritisation and planning in establishing the MPA(s). Nothing in the criteria indicates which protective measures may be taken by states once they have identified

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[402] ASEAN Clearing House Mechanism, ASEAN Heritage Park. Available https://asean.chm-cbd.net/map-asean-heritage-parks-march-2020; accessed 2 Feb 2022

[403] See the description on the ASEAN Clearing House Mechanism. Available https://asean.chm-cbd.net/mu-ko-ang-thong-marine-national-park; accessed 2 Feb 2022

[404] Criteria available at https://cil.nus.edu.sg/databasecil/2002-asean-criteria-for-national-marine-protected-areas/; accessed 2 Feb 2022. Notes of the meeting from Singapore's National Archives made available online: https://www.nas.gov.sg/archivesonline/data/pdfdoc/MSE_20021121001.pdf; accessed 2 Feb 2022

an area according to the guidelines. Long-term conservation may therefore not need to be the primary objective of the MPA.[405]

An unusual feature of this set is that it is not focused on ecological criteria as a driver for protective measures; ecological criteria constitute only one of a group of five sub-criteria in the overall set of criteria. Nevertheless, another sub-criterion, labelled 'regional representativeness', is also of an ecological nature, although it falls in the 'Regional' rather than 'Ecological' category (Table 1.19 below).

The social criteria which highlight the social benefits that can be used as grounds for an area to qualify for protection are particularly unusual. So are the stated economic and pragmatic criteria. Although benefits of MPAs to fisheries and tourism are often defended by MPA advocates, they are not common criteria for the selection of MPAs. Such an inclusion implies that an area that can provide those benefits (in addition to ecological benefits) would score higher (on the MPA suitability rating) than one that presents similar ecological benefits or even possibly higher ecological benefits but no economic benefits. Similarly, the pragmatic criteria include considerations often not included in national policy papers, although they would be taken into account by national policy analysts.

No management measures are attached to these criteria being met in the Declaration or in ASEAN documents. The concept of an MPA being used in the Declaration is also undefined.[406]

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[405] This is consistent with the spirit of ASEAN policies which promote sustainable use of coastal and marine environment rather than conservation as embodied in the last ASEAN Socio-Cultural Community Blueprint 2025, element C1 on 'conservation and sustainable management of biodiversity and natural resources'. Strategic measure C1(iii) reads: 'promote cooperation for the protection, restoration and sustainable use of coastal and marine environment, respond and deal with the risk of pollution and threats to marine ecosystem and coastal environment, in particular in respect of ecologically sensitive areas' [emphasis added]; see ASEAN Socio-Cultural Community Blueprint 2025 [10]. Available https://www.asean.org/wp-content/uploads/2012/05/8.-March-2016-ASCC-Blueprint-2025.pdf; accessed 2 Feb 2022. CBD Article 2 defines protected areas as 'a geographically designed area which has been designated or regulated or managed to achieve specific conservation objectives'. CBD COP7 Resolution VII/5 endorses a definition of coastal and marine protected areas according to which it is sufficient that the area enjoys a higher level of protection than the surroundings. By contrast, the IUCN defines a protected area as one designed 'to achieve the long-term conservation of nature with associated ecosystem services and cultural values'; IUCN (2012) Guidelines for Applying the IUCN Protected Area Management Categories to Marine Protected Areas, IUCN, Gland, Switzerland. See Section 5.5 of the Introduction

[406] However, the spirit of the ASEAN approach to conservation is focused on sustainable use, Blueprint 2025, ibid

Table 1.19: 2002 ASEAN Criteria for Marine National Protected Areas

#	Criterion category	Criterion (specific)	Description
1.11	Social	Social acceptance	Degree to which the support of local people is assured. Protection by local tradition or practice should be encouraged and receive a higher rating
1.2		Public safety	Degree to which the creation of an MPA may diminish pollution or other disease agents that contribute to public safety
1.3		Recreation	Degree to which the area is, or could be, used for recreation (use, enjoy and learn)
1.4		Culture	Religious, historic, artistic or other cultural value of the site
1.5		Aesthetics	Seascape, landscape, or other area of exceptional scenic beauty. Where species diversity and the biological conservation value are low, such areas retain a high value for recreation and tourism
1.6		Conflicts of interest	Degree to which area protection would affect the activities of local residents. Careful zoning may limit conflicts.
1.7		Accessibility	Ease of access across both land and sea. More importance for MPAs with predominantly social objectives and economic objectives to a lesser degree
1.8		Research, Education and Public awareness	Degree to which an area represents various ecological characteristics and can serve for research and demonstration of scientific methods (can be as 'control site' or for ecological monitoring)
1.9		Conflict and compatibility	Degree to which an area may help to resolve conflicts between natural resource values and human activities
2.1	Economic	Importance to economic species	Degree to which certain commercially important species depend on the area; dependence of fishermen and size of fishery yield to be considered
2.1		Nature of threats	Extent to which changes in use patterns threaten the overall value to people, justifying further management
2.3		Direct and indirect economic benefits	Degree to which protection will benefit the local economy in the long term (e.g. conservation benefiting tourism)
3.1	Ecological	Diversity	Variety or richness of ecosystems, habitats, communities and species
3.2		Naturalness	Lack of disturbance or degradation
3.3		Dependency	Degree to which a species depends on an area, or the degree to which an ecosystem depends on ecological process
3.4		Representativeness	Degree to which an area represents a habitat type, ecological process, biological community, physiographical feature or other natural characteristic
3.5		Uniqueness	Whether an area is 'one of a kind'
3.6		Integrity	Degree to which the area is a functional unit – an effective, self-sustaining ecological entity
3.7		Productivity	Degree to which productive processes within the area contribute benefits to species or to humans
3.8		Vulnerability	Degree to which an areas is susceptible to degradation by natural events or the activities of people
4.1	Regional	Transboundary implications	Degree to which the area play a role in nutrients, materials or support for species (especially migratory ones) to the region as a whole
4.2		Regional representativeness	Degree to which the area represents a characteristic of the region, whether a physical, geological or ecological feature
5.1	Pragmatic	Urgency	Degree to which immediate action must be taken
5.2		Size	Should be large enough to ensure effective protection of the area
5.3		Degree of threat	Present and potential threats from direct exploitation and development projects
5.4		Practicality	Feasibility of implementing a management programme
5.5		Opportunism	Degree of the existing or future opportunity
5.6		Availability	Degree to which the area is available for acquisition or can be managed satisfactorily
5.7		Restorability	Degree to which the area may be returned to its former natural state

1.5.3 ASEAN Declaration for the Conservation and Protection of Sea Turtles

Prior to the adoption in 2001 of the IOSEA Marine Turtle MOU,[407] the ASEAN states signed an MOU on ASEAN Sea Turtle Conservation and Protection in 1997.[408] The objective of this MOU is to

> promote the protection, conservation, replenishing and recovery of sea turtles and of the habitats based on the best available scientific evidence.

It applies to the five places where sea turtles 'live at any stage of their life cycles'. However, no guidance is provided on the way to identify them.

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This first Chapter, like Chapter 2 that follows, is focused on the first research question, that is, the identification of the scientific and technical criteria that characterise sensitive marine areas under international law and are applicable to littoral states in the SCS. This first chapter investigated applicable conservation instruments that come from five families of conservation-focused instruments. The review included 10 global and regional instruments and the context for the development of seven sets of scientific and technical criteria.

The following chapter proceeds with the same investigation, with respect to four types of pollution focused instruments. First, applicable instruments related to the identification of sensitive areas in the context of pollution from shipping activities. Second, applicable instruments related to the identification of sensitive areas in the context of adverse environmental impacts from fisheries activities. Third, applicable instruments related to the identification of sensitive areas in the context of adverse environmental impacts from deep seabed mining. Fourth, applicable instruments related to the identification of sensitive areas in the context of the placement of waste and other matter at sea.

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[407] See supra Chapter 1 Section 1.4.2 on sea turtles in Southeast Asia

[408] 1997 MOU on ASEAN Sea Turtle Conservation and Protection, 12 September 1997 (entry into force 12 September 1997). Available https://cil.nus.edu.sg/databasecil/1997-memorandum-of-understanding-on-asean-sea-turtle-conservation-and-protection/; accessed 2 Feb 2022

Chapter 2: Identification of sensitive areas for the purpose of limiting pollution and adverse impact from maritime activities

The main international instruments which seek to regulate activities at sea globally and protect and preserve the marine environment, including sensitive marine areas, are presented below. They are grouped according to the categories of activities at sea they regulate.[409]

2.1 Shipping regulations adopted by the IMO

The IMO is the United Nations specialized agency responsible for the promotion of safe, secure, environmentally sound, efficient and sustainable shipping through cooperation. This is accomplished by, *inter alia,* adopting the highest practicable standards of prevention and control of pollution from ships.[410] According to its constitutive treaty, one of the purposes of the IMO is to consider any matters concerning shipping and the effect of shipping on the marine environment.[411] The IMO has overseen the development of several mechanisms to provide increased protection from shipping in areas considered to be particularly sensitive.

The first mechanism, developed under the 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 schemes and ship reporting systems.

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[409] Not all activities conducted at sea, whether within or beyond national jurisdiction, are regulated internationally. Within national jurisdiction, offshore oil and gas activities and other types of mineral extractions are activities for which States have failed to fulfil their obligation to agree global rules and standards as provided in UNCLOS, Article 208. See A Roach (2013) International Standards for Offshore Drilling, in 'The Regulation of Continental Shelf Development: Rethinking
International Standards', MH Nordquist et al (eds.), Brill Nijhoff, The Netherlands [105-152]

[410] IMO's mission statement, See https://www.imo.org/en/About/HistoryOfIMO/Pages/Default.aspx; accessed 7 Feb 2022

[411] 1948 Convention on the International Maritime Organization, 6 March 1948 (entered into force on 17 March 1958) 289 U.N.T.S. 3 [the 1948 IMO Convention], Article 1(d)

2.1.1 Special Areas under MARPOL

2.1.1.1 Source instrument and legal background

The MARPOL Convention is the main IMO instrument for the prevention of pollution from shipping; it regulates both operational discharges and accidental pollution through six technical annexes, each devoted to a specific type of pollution:

- Annex I for oil,
- Annex II for noxious liquid substances in bulk,
- Annex III for harmful substances in packaged forms, or in freight containers,
- Annex IV for sewage,
- Annex V for garbage; and,
- Annex VI for air pollution.

In Annexes I, II, IV and V, MARPOL defines certain sea areas as 'Special 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.[412] 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 more stringent restrictions on specific atmospheric emissions from ships (sulphur emissions and nitrogen oxides) in Annex VI.[413]

This development of 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

[412] 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

[413] 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 https://www.imo.org/en/OurWork/Environment/Pages/Air-Pollution.aspx; accessed 7 Feb 2022

Conference on Tanker Safety and Pollution Prevention 1978.[414] This resolution also highlights the comparability of new 'Special Areas' under MARPOL with provisions of the London Dumping Convention which encourage states with a common interest in a given geographical area to enter into regional agreements to further limit dumping. Finally, this Conference invites the IMO to continue its efforts and to initiate studies for this purpose involving:

- an 'inventory of the sea areas around the world which are in special need of protection against marine pollution from ships and dumping, on account of the areas' particular sensitivity in respect of their renewable natural resources or in respect of their importance for scientific purposes', as well as
- an assessment of 'the extent of the need of protection, as well as the measures which might be considered appropriate, in order to achieve a reasonable degree of protection, taking into account also other legitimate uses of the seas'.[415]

As of 7 February 2022, 20 Special Areas are established under MARPOL Annexes I, II, IV and V and four Emission Control Areas under Annex VI. Some areas are protected under several annexes; these include the Antarctic area, the Mediterranean Sea, the Baltic Sea, the Black Sea and the 'Gulfs area'.[416] The last Special Area designated was the Baltic Sea, under MARPOL Annex IV, in 2011.[417] So far, none of the designated Special Areas are in Asia.

2.1.1.2 Status of adoption

Table 2.1 below shows the wide acceptance of MARPOL globally, with the last and more recent Annex VI on air pollution still lagging behind.

MARPOL and its Annexes are generally accepted by littoral states of the SCS, although Annexes

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[414] The term 'particularly sensitive sea area' is re-used later by the IMO when the new concept of PSSA is created in 1991. Final Act of the International Conference on Tanker Safety and Pollution Prevention 1978, U.N.T.S. 1340: I-22484 [133]. Available https://treaties.un.org/doc/Publication/UNTS/Volume%201340/volume-1340-I-22484-English.pdf; accessed 7 Feb 2022

[415] Ibid

[416] Special Areas under MARPOL. Available https://www.imo.org/en/OurWork/Environment/Pages/Special-Areas-Marpol.aspx; accessed 7 Feb 2022

[417] Ibid

III to VI do not enjoy unanimous adoption (Table 2.1).

Table 2.1: Status of adoption of MARPOL Annexes globally (10 January 2022)[418]

MARPOL Annex	Number of state parties	% of the gross tonnage of the world's merchant fleet
I and II (oil and noxious liquid substances in bulk)	160	99.01
III (harmful substances carried in packaged form)	150	98.49
IV (sewage)	146	96.33
V (garbage)	155	98.64
VI (air pollution)	101	96.75

Table 2.2: Status of adoption of the MARPOL Convention by littoral state of the SCS (10 January 2022)

Littoral states of the SCS	Adoption MARPOL[419]	Adoption of Annex III [420]	Adoption of Annex IV	Adoption of Annex V	Adoption of Annex VI
Brunei Darussalam	1986	2016		2016	
Cambodia	1994	1994	1994	1994	
China	1983	1994	2006	1988	2006
Indonesia	1986	2012	2012	2012	2012
Malaysia	1997	2010	2010	1997	2010
Philippines	2001	2001	2001	2001	2018
Singapore	1990	1994	2005	1999	2000
Thailand	2007				
Vietnam	1991	2014	2014	2014	2014

2.1.1.3 Scientific and Technical Criteria

Several guidelines have been adopted by the Marine Environmental Protection Committee (MEPC) for the designation of Special Areas. The first guidelines were adopted in 2001 and

[418] See https://wwwcdn.imo.org/localresources/en/About/Conventions/StatusOfConventions/Status%20-%202022.pdf; accessed 7 Feb 2022

[419] Date of signature of deposit of instruments. This includes Annexes I and II. Status of IMO Treaties, ibid

[420] No Special Area is provided for under this Annex

concerned both the designation of Special Areas and the identification of PSSAs.[421] 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).[422] They set out in detail the conditions to be met for an area to qualify as a Special Area under MARPOL Annexes I, II, IV and V.[423] 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 2.2.[424]

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

	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

The area needs to meet all three categories of conditions but does not need to fulfil all the

[421] IMO Assembly Resolution A.720(17), 6 November 1991. They were revoked and replaced by 2001Guidelines for the Designation of Special Areas under MARPOL 73/78 and Guidelines for the Identification and designation of PSSAs, IMO Assembly Resolution A.927(22), 29 November 2001. These were revised in 2005 by IMO Assembly Resolution A.982(24), 1 December 2005 (removing parts relating to PSSAs), before being again revoked and replaced by the 2013 Guidelines which are currently applicable.

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

[423] 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

[424] Based on the Special Area Guidelines

ecological criteria listed. Meeting any one ecological criterion[425] would be sufficient, provided that the oceanographic conditions and the vessel traffic characteristics demonstrate the threat posed by the discharge.

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 and resources needing increased protection. This assessment of impact must also include a cumulative impact assessment of existing stressors on the marine species, resources, and ecosystems.[426] The Special Area Guidelines state 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.

2.1.1.4 Designation procedure and status

The geographic coordinates of each Special Area and Emission Control Area are included in the body of the relevant Annex to MARPOL, sometimes with reference to another Annex.[427] An amendment of the relevant Annex is therefore necessary for a new Special Area to be designated. It must be proposed by one or several states and then discussed at the following meeting of the MEPC.[428]

A Special Area may encompass the maritime zones of several states or even an entire enclosed or semi-enclosed sea area,[429] such as the Baltic Sea, the North Sea and the Mediterranean Sea. The SCS (or a sub-part of it) would therefore qualify, provided that all the other conditions are met.

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[425] for instance, the spawning ground of a commercially important species (criterion 2.3) or large aggregation of an endangered species (criterion 2.1)

[426] Special Area Guidelines para. 2.9

[427] MARPOL Annex I Regulation 10 and Annex V Regulation (5). MARPOL Annex II Regulation 1(7) refers to geographic descriptions in Annex I

[428] MARPOL Article 16(2)(a)

[429] Special Area Guidelines para. 2.2

2.1.1.5 Restricted activities

Specific discharge limits are imposed for Special Areas under each Annex. For Annex I (oil pollution), discharge of oil or oily mixtures must not exceed 15 parts per millions, except as set out in the Annex. Reception facilities must also be established in Special Areas.[430] For Annex II (harmful substances in packaged form), restricted discharge limits are provided for different categories of substances that reflect their toxicity.[431] For Annex IV (sewage), discharge of sewage in Special Areas is prohibited except when an approved sewage treatment plant is in operation and according to specific conditions.[432] For Annex V (garbage), disposal of plastics and other garbage is prohibited in Special Areas, except for the disposal of food waste under certain conditions.[433]

2.1.1.6 Reporting, monitoring and review process

The Special Area Guidelines do not mention any reporting, monitoring and review process. At MEPC 70

> the Committee noted that there are no requirements to regularly evaluate the effectiveness of [Special Areas under MARPOL] once they have been designated, although such an evaluation procedure could be incorporated in the [Special Area Guidelines].[434]

2.1.2 PSSAs

2.1.2.1 Legal background

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'.[435] Therefore, this includes ship-source pollution

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[430] MARPOL Annex I Regulations 10 and 11

[431] MARPOL Annex II Regulations 7-8

[432] MARPOL Annex IV Regulation 11 and 12bis

[433] MARPOL Annex V Regulations 5-6

[434] Report of MEPC 70 [para. 8.8]

[435] Definition from the MEPC 36th session in 1986 as reiterated in the 1991 Guidelines Preface, supra note 422

and environmental hazards associated with shipping, such as physical damage to marine habitats or organisms.[436] The PSSA concept was developed by the IMO to attract attention to sensitive areas and provide a basis on which associated protective measures (APMs) may be recognised and endorsed by the IMO.[437] Part of the early thinking, as is clearly stated in the first guidelines adopted in 1991, framed PSSAs as a means to adopt complementary measures in MPAs,[438] either national or adopted in the context of global or regional seas agreements.[439] The 1991 Guidelines refer specifically to MPAs designated in the context of the World Heritage Convention, Ramsar Convention and CMS.[440] Therefore, the designation of PSSAs includes criteria developed under these other instruments to identify sensitive areas.[441]

As of 8 February 2022, 15 PSSAs have been designated: seven are in the Indo-Pacific, five in Europe and the Mediterranean seas, and three in the Atlantic Ocean and Caribbean seas.[442] The first PSSA in Southeast Asia was Tubbataha Reefs Natural Park, adopted in March

[436] 1991 Guidelines para. 1.4.8, supra note 422

[437] G Peet (1994), supra note 119

[438] The PSSA mechanism would be particularly useful to impose restrictions on shipping in sensitive areas that lie beyond the coastal state jurisdiction to impose unilateral protective measures on foreign vessels; examples include sensitive areas in EEZs and in international straits. See Gjerde and Freestone's account 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] Nevertheless, many PSSAs have been designated within 12NM of the coast where obtaining the IMO approval may also be necessary if the protective measure could interfere with the right of innocent passage of foreign vessels.

[439] 1991 Guidelines Chapter 1 Marine Protected Areas, supra note 422

[440] 1991 Guidelines para. 1.3.2 to 1.3.5, supra note 422. Unlike the following guidelines, the 1991 Guidelines include very useful information on the historical development of the PSSA concept and examples of situations where it may be used and specific measures which may be taken.

[441] See Chapter 1 Sections 1.2 to 1.4 of this study. The criteria for the identification of sensitive areas under the CBD are included in revised guidelines, after this convention entered into force.

[442] IMO webpage on PSSAs. Available https://www.imo.org/en/OurWork/Environment/Pages/PSSAs.aspx; accessed 8 Feb 2022

2017 (MEPC 70).[443] It is in the Sulu Sea.

2.1.2.2 Conditions and scientific criteria

The PSSA mechanism and procedure are described in guidelines developed by the MEPC and reviewed several times to increase the rigour of the process and respond to criticisms.[444] (see Table 2.4 below) 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).[445] The PSSA Guidelines set out three cumulative conditions for the designation of PSSAs:

- 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)[446]
- 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, volume, etc.), natural factors, evidence of adverse effects from shipping, history of incidents, and analysis of actual or expected benefits

[443] Resolution MEPC 294(71). There are three other known pending PSSA proposals in Southeast Asia. First, Malaysia made an application which was postponed for a PSSA seaward of Pulau Kukup and Tanjong Piai in the Strait of Malacca; it was also considered at MEPC71 but postponed due to opposition from Indonesia. See MEPC 294(71). Vietnam submitted an information document to MEPC69 in 2016 for a possible PSSA in Ha Long Bay-Cat Ba Island, but no formal proposal has yet been submitted (MEPC 69/INF.12). Finally, Indonesia is working on a PSSA in Lombok Strait and has submitted information papers on a PSSA proposal and a proposal for routeing measures; MEPC71/INF39 and NCSR 5/INF23. However, no formal proposal has yet been submitted for a PSSA. See also the report from NUS Centre for International Law on PSSAs in Southeast Asia: Trends and Prospects, 11-12 October 2017. Available https://cil.nus.edu.sg/wp-content/uploads/2018/02/PSSAs-Workshop-Final-Report.pdf; accessed 8 Feb 2022

[444] See, for instance, KM Gjerde (2001) Protecting Particularly Sensitive Sea Areas from Shipping: A Review of IMO's new PSSA Guidelines, Proceedings of the 12th Biennial Coastal Zone Conference, Cleveland - USA, July 15-19, 2001. Available https://webapp1.dlib.indiana.edu/virtual_disk_library/index.cgi/4916229/FID2748/pdf_files/gjerdek.pdf; accessed 8 Feb 2022. J Roberts (2007) Marine Environment Protection and Biodiversity Conservation – The Application and Future Development of the IMO's Particularly Sensitive Sea Area Concept, Springer Berlin Heidelberg, New York – USA [88-96]

[445] 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 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 https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/A24-Res.982.pdf; accessed 8 Feb 2022

[446] Based on the PSSA Guidelines

from past or prospective measures.[447]

- The area has one or several appropriate APMs that the IMO has competence to approve (see below).[448]

Until the last PSSA that was adopted in 2017, proposals for PSSA designations often made a case based on most of the 17 criteria, if not all. Although the ecological criteria often appeared to dominate the presentation, the social, cultural and economic criteria and the scientific and educational criteria were also mentioned. This was the case for the last two PSSA designations: the Tubbataha Reefs Natural Park, in 2017, proposed by the Philippines[449] and Jomard entrance, in 2016, proposed by Papua New Guinea.[450]

2.1.2.3 Restricted Activities: Associated Protective Measures

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.[451]

Possible APMs include:[452]

- routeing measures, such as areas to be avoided (ATBA), no-anchoring areas, precautionary areas and two-way routes under the International Convention for the

[447] PSSA Guidelines section 5

[448] PSSA Guidelines sections 6 and 7.5 to 7.10

[449] The application of each and every criterion is included in the Philippines' proposal. See the Report of the Technical Group on PSSAs at MEPC 71 (MEPC71/WP10).

[450] Most criteria are applied by Papua New Guinea. See the Report of the Technical Group on PSSAs at MEPC 70 (MEPC70/WP9).

[451] PSSA Guidelines Sections 6.1 and 7.5.2

[452] For further details on APMS and historical developments on ships routeing and reporting systems, see MJ Kachel (2008) Particularly Sensitive Sea Areas – The IMO's Role in Protecting Vulnerable Marine Areas, International Max Planck Research School for Maritime Affairs at the University of Hamburg, Springer [189-212] and J Roberts (2005) Protecting Sensitive Marine Environments: The Role and Application of Ships' Routeing Measures, The International Journal of Marine and Coastal Law 20: 135-159 [114-131]

Safety of Life at Sea (SOLAS) and in accordance with the General Provisions on Ships' Routeing (GPSR).[453] Routeing measures are generally recommendatory unless the request demonstrates compelling reasons for the measures to be mandatory that are accepted by the IMO.[454] Traffic separation 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);[455]

- reporting systems, under SOLAS and the Guidelines and Criteria for Ship Reporting Systems, which aim to provide information to coastal states on all or specific categories of vessels present in a given area;[456]
- discharge (or emission) restrictions, on the basis of MARPOL Annexes I, II, IV, V and VI, and 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;[457] and,
- vessel traffic management services (VTS), including pilotage services.[458]

The 15 designated PSSAs employ a diversity of APMs, including several mandatory routeing

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[453] Regulation 10 of SOLAS Chapter V provides the IMO with the authority for the adoption of ship routeing systems. International Convention for the Safety of Life at Sea, 1 November 19974, (entered into force on 25 May 1980) 1184 U.N.T.S. 2, as amended [SOLAS Convention]; General provisions on ships' routeing adopted by IMO Assembly Resolution A.572(14), as amended (GPSR). 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.

[454] IMO Guidance Note, ibid

[455] 1972 International Regulations for Preventing Collisions at Sea, 20 October 1972 (entered into force on 15 July 1977) 1050 U.N.T.S. 16; 1143 U.N.T.S. 346 (rectification), as amended (COLREGS)

[456] 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)

[457] 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments, 13 February 2004 (Entered into force on 8 September 2017) Regulation C-1. See section 2.1.4 below on the Ballast Water Convention.

[458] 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 define the role of the IMO in this respect. VTS include a wide range of shore-based communication systems from one-way messages to vessels to exchange of messages and even management of traffic. VTS services and recommendatory pilotage measures have been approved by the IMO in several areas. For a discussion on VTS and pilotage see J Roberts (2005) and MJ Kachel (2008), supra note 453

measures, nine ATBAs, several mandatory non-anchoring areas and five mandatory and recommendatory Ship Reporting Systems.[459]

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

Alternative Criteria Category	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 forest, 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		Bio-geographic 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

[459] List of Special Areas under MARPOL and Particularly Sensitive Areas, MEPC 1/Circ 778/Rev.2, 6 April 2017, updated with the report of MEPC 71.

2.1.2.4 Identification and Designation procedure

An application to IMO for designating an area as a PSSA may be submitted only by one or several member states of the IMO, including all the littoral states of the SCS.[460] 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.[461] Whereas 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.[462] 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 already been 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.[463] 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.[464]

2.1.2.5 Reporting, monitoring and review process

According to Section 8.4 of the PSSA Guidelines,

> IMO should provide for the review and re-evaluation of any APM adopted, as

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[460] PSSA Guidelines Section 3. To become a Member State of the IMO, a State's government must have adopted the 1948 IMO Convention. As off 7 February 2022, there are 174 Member States of the IMO. List of Member States available at http://www.imo.org/en/About/Membership/Pages/MemberStates.aspx; accessed 7 Feb 2022

[461] PSSA Guidelines Sections 3 and 7

[462] NCSR is a Sub-Committee to the Maritime Safety Committee (MSC), created from the merger of the Sub-Committees on Navigation (NAV) and Radiocommunications 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. See IMO website's description of NCSR, available at https://www.imo.org/en/MediaCentre/MeetingSummaries/Pages/NCSR-default.aspx; accessed 8 Feb 2022

[463] With respect to the proposal from Papua New Guinea to designate the Jomard Entrance as a PSSA, the report of MEPC 30 notes that two routeing systems (four two-way routes and a precautionary area) were 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.

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

necessary, taking into account pertinent comments, reports, and observations of the APMs.

IMO member states are encouraged to submit any updates, request for modifications, or concerns with respect to APMs or PSSAs to the appropriate IMO committees. The opportunity to institute a more rigorous system to review the effectiveness of PSSAs and their APMs was discussed at MEPC 65 and MEPC 70, prompted each time by documents submitted by a party or observer. [465] However, despite the importance of the review process being recognised by several delegations, there was insufficient support for the PSSA Guidelines to be amended to impose a more stringent procedure.[466] Independently of this process, routeing measures adopted by the IMO are subject to review in accordance with the GPSR.[467]

2.1.3 Direct applications for routeing measures, VTS and reporting systems (outside an application for PSSA)

As mentioned at the beginning of Chapter 2, 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 and mandatory routeing measures designed to protect the marine environment, without engaging in a PSSA procedure.[468] Examples include ATBAs to protect whales against ship strikes, sensitive coastline environments and marine reserves, mandatory no-anchoring areas and other routeing measures, without having to submit an application for a PSSA.[469] A still recent example is an ATBA off Peninsula de Osa on the Pacific Coast of Costa Rica adopted at

[465] Documents submitted by 1) WWF and IUCN (MEPC 65/9) and 2) proposal by Russia for the amendment of the PSSA Guidelines in order to institute a regular reporting process on PSSA effectiveness, see MEPC 70/8/1 and MEPC 70/18 Section 8

[466] MEPC 65/22 Section 9, 24 May 2013 and MEPC 70/18 Section 8

[467] GPSR Section 5.2. See Kachel (2008) [196], supra note 453

[468] J Roberts reports 22 areas for which routeing measures for environmental protection had been adopted by 1994 and another 14 by 2004. J Roberts (2005) [122-123], supra note 453

[469] Ibid

MSC 97 (in March 2017) and motivated largely by the avoidance of ship strikes on humpback whales and other large cetaceans and the sensitivity of the surrounding sea area.[470]

The three IMO mechanisms discussed in this section aim to identify sensitive marine areas that could be adversely affected by shipping activities, in order to modify shipping operations and alleviate the risk. Although they are the most developed IMO mechanisms of this type, other IMO instruments are also concerned with impacts on sensitive marine areas. They are the subject of the following three sections.

2.1.4 Sensitive areas under the 2004 Ballast Water Convention

This Convention seeks to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. Ballast Water Management systems involve mechanical, physical, chemical, and biological processes to remove, render harmless, and avoid the uptake and discharge of Harmful Aquatic Organisms and Pathogens within Ballast Water and Sediments.[471] Additional measures other than those provided for in the Convention may be adopted by states in certain areas where they are necessary to prevent, reduce, and eliminate the transfer of Harmful Aquatic Organisms and Pathogens through ships' Ballast Water and Sediments.[472] Sensitive areas for different purposes are also mentioned in several guidelines adopted for the implementation of this convention in the context of:

- avoiding sensitive areas when determining ballast water exchange areas (Guidelines on Designation of Areas for Ballast Water Exchange, G14)[473]
- applying precautionary practices and minimizing the uptake of ballast water in sensitive sea areas (Guidelines for Ballast Water Management and Development of

[470] NCSR 4/3/2, Annex 3 to NCSR 4/WP7 – 8 March 2017 and NCSR 4/29

[471] Ballast Water Management Convention Article 1(3)

[472] Ballast Water Management Convention Regulation C-1

[473] Guidelines on Designation of Areas for Ballast Water Exchange, Section 8.2.4, MEPC 55/23

Ballast Water Management Plans);[474]

- limiting ballast water exchange and sediment discharge in the Antarctic Treaty Area, a Special Conservation Area and avoiding risk of alien species invasion from Antarctic waters to Arctic waters and *vice-versa* (Guidelines for Ballast Water Exchanges in the Antarctic Treaty Area).[475]

Although these mechanisms may provide a legal basis for APMs in the context of a PSSA, this is still a theoretical possibility as no application has yet been made to the IMO to that effect.

Table 2.5: Parties to the Ballast Water

Littoral states of the SCS	Adoption
Brunei Darussalam	-
Cambodia	-
China	22 Oct 2018
Indonesia	24 Nov 2015
Malaysia	27 Sept 2010
Philippines	6 June 2018
Singapore	8 Jun 2017
Thailand	-
Vietnam	-

The Convention also contains a specific provision on threats and risks to sensitive, vulnerable or threatened marine ecosystems and biodiversity in areas beyond the limits of national jurisdiction in relation to Ballast Water Management. Parties shall endeavour to co- operate under the auspices of the IMO to address these threats and risks.[476]

The Ballast Water Management Convention, which came into effect on 8 September 2017, has 89 contracting states, whose combined merchant fleets constitute approximately 91.19%

[474] Guidelines for Ballast Water Management and Development of Ballast Water Management Plans (G4) para. 2.2.2, MEPC 53/24/Add.1

[475] Guidelines for Ballast Water Exchanges in the Antarctic Treaty Area, MEPC 163(56)

[476] Ballast Water Management Convention Article 2(9)

of the gross tonnage of the world's merchant fleet.[477] Five coastal states of the SCS are parties to this convention. Given its recent entry into force and the high number of states which became parties in the last five years, other littoral states of the SCS may follow.[478] (Table 2.5 below)

2.1.5 Sensitive areas under the 2007 Nairobi Convention on the Removal of Wrecks

The Nairobi Convention on the Removal of Wrecks (the Nairobi Convention)[479] seeks to ensure the prompt and effective removal of wrecks as they may pose a hazard to navigation and the marine environment. It regulates the circumstances in which an affected state may request or proceed with the removal of a wreck posing a hazard. One of the criteria that may be taken into account is where the wreck may adversely affect a 'particular sensitivity sea area' or another area of an EEZ where special mandatory measures have been adopted according to Article 211(6) of UNCLOS.[480]

The Nairobi Convention, which came into force on 14 April 2015, has 56 states parties as of 10 January 2022, including four littoral states of the SCS. (Table 2.6 below) This is arguably not sufficient for this Convention to be considered a globally accepted rule and standard under UNCLOS.[481] However, the express reference to PSSAs and their criteria is noteworthy and supports the argument that these criteria may be viewed as globally accepted standards under UNCLOS.

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[477] Status on 10 January 2022 as provided in the IMO Comprehensive Information on the Status of Multilateral Conventions and Instruments in respect of which the IMO or its Secretary-General Performs Depositary or Other Functions. Available https://www.imo.org/en/About/Conventions/Pages/StatusOfConventions.aspx; accessed 8 Feb 2022

[478] Fifty States out of 89 have adopted the instrument on or after 2012. See HC Yang et al (2017) Entry into Force of Ship Ballast Water Management Convention and its Implementation from Perspective of Northeast Asia, Journal of International Maritime Safety, Environmental Affairs and Shipping 1: 19-21.

[479] 2007 Nairobi Convention on the Removal of Wrecks, 18 May 2007 (Entered into force on 14 April 2015) 46 ILM 694. Status of adoption, see supra note 478

[480] Nairobi Convention Article 6(d). UNCLOS Article 211(6) provides for coastal states' right to adopt mandatory measures to prevent pollution from vessels that are more restrictive than generally accepted international rules and standards. Coastal states can apply them when they have reasonable grounds for believing that a clearly defined area of their EEZ requires such measures for recognised technical reasons related to its oceanographic and ecological conditions, as well as its utilisation and the protection of its resources and the particular character of its traffic.

[481] See the discussion on this in the context of the London Convention and its Protocol, *infra* Chapter 2 Section 2.4

Table 2.6: Parties to the Nairobi Convention in the SCS

Littoral states of the SCS	Adoption
Brunei Darussalam	-
Cambodia	-
China	11 Nov 2016
Indonesia	14 December 2020
Malaysia	28 Nov 2013
Philippines	-
Singapore	8 Jun 2017
Thailand	-
Vietnam	-

2.1.6 Sensitive area mapping to support oil spill response and preparedness under the 1990 Convention on Oil Pollution Preparedness, Response and Co-operation

the 1990 Convention on Oil Pollution Preparedness, Response and Co-operation[482] (1990 OPRC) seeks to ensure that states take all the necessary measures to prepare for and respond to an oil spill incident; it fleshes out the legal duties necessary to ensure adequate preparedness, contingency planning and response to a spill. The measures include on-board oil pollution emergency plans, and, for all areas surrounding oil handling facilities, availability of oil combatting equipment, oil pollution reporting procedures, a national system in place to respond, and cooperation mechanisms.

As of 10 January 2022, OPRC was adopted by 115 states globally and five of the nine littoral states of the SCS.
[483] (Table 2.7 below) Several sets of guidelines were adopted by the IMO to support the implementation of OPRC. Of importance, in the context of the protection of sensitive marine and coastal areas, is the Guidance on sensitivity mapping for oil spill response, first published in 1996 and subsequently updated by MEPC 63 (The Sensitivity Mapping Guidance).[484] This guidance document provides a methodology to map sensitive marine habitats and marine biodiversity, to mitigate the impacts of oil pollution incidents, according

[482] 1990 Convention on Oil Pollution Preparedness, Response and Co-operation, 30 November 1990 (entered into force on 13 May 1990) 1891 U.N.T.S. 77

[483] Status of adoption, supra note 478

[484] MEPC63/23 adopts the Guidance submitted as MEPC62/8, MEPC 210(63). Available https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.210(63).pdf; accessed 8 Feb 2022

to a three-tier approach based on the expected severity of the spill.[485] This approach is different from the approaches chosen for the sets of criteria previously reviewed. It seeks to map:

- shoreline types, including the substrate and ecosystem type (different types may have different sensitivity to an oil spill – e.g. an exposed rocky shore may, under certain circumstances, be less sensitive than a tidal flat or a mangrove area);
- biodiversity-sensitive elements, including sensitive areas,species and sub-tidal habitats;
- sensitive socio-economic features;
- oil spill response operational and logistical features;
- potential sources of accidental pollution.

Following the identification and mapping of the different types of shores, sensitive ecosystems and natural ecosystems, as well as socio-economic features, their sensitivity to a potential oil spill must be ranked based on their expected recovery time (on a scale of 1 to 10). This sensitivity includes both intrinsic sensitivity and exposure to oil (depending on oil type and conditions).

Table 2.7: Parties to OPRC in the SCS

Littoral states of the SCS	Adoption
Brunei Darussalam	-
Cambodia	-
China	30 Mar 1998
Indonesia	-
Malaysia	30 Jul 1997
Philippines	6 Feb 2014
Singapore	10 Mar 1999
Thailand	20 Apr 2000
Vietnam	-

Sensitivity mapping is developing globally as a standard practice for oil-related activities, both coastal and offshore. Progress can be seen on this in Southeast Asia through different

[485] Adopted at MEPC 63 held in March 2012, 2011 IMO/IPIECA Guidance on Sensitivity Mapping for Oil Spill Response (Doc MEPC 62/8).

initiatives and projects, especially the Gulf of Thailand sensitivity index for sensitivity mapping[486] and the impetus provided by the IMO-IPIECA[487] Global Initiative for Southeast Asia and the 2014 MOU on ASEAN Cooperation Mechanism for Joint Oil Spill Preparedness and Response. The latter is designed to apply to oil spill incidents in the ASEAN region.[488]

Table 2.8: Oil Sensitivity Mapping under OPRC

	Components	Sub-components	Description
1	Shoreline types	Grain, size, slope Exposure to wave Biological productivity and sensitivity	Mapping shoreline type and its general environmental sensitivity. Includes exposed rocky shore, wave-cut platforms in bedrock, mud or clay, sand, gravel, mud beaches/flats, sheltered shores, tidal-flats, marshes, mangroves, etc.
2.1	Biodiversity-sensitive elements	Sensitive areas and species	Includes endangered sensitive species, coastal and marine
2.2		Sub-tidal habitats	e.g. coral reefs, sea grass beds and kelp beds
3	Socio-economic features	Living resources Non-living resources Managed areas	e.g. aquaculture, subsistence and commercial fishing/fishing villages Water intakes, tourism and recreation areas, industrial activities, infrastructures, cultural sites, etc. Include features that may be affected

The Sensitivity Mapping Guidance states that the sensitivity maps should be updated regularly (every three to five years) to take into account any modification of the coast and location of sensitive biological resources. However, no other management measures flow from OPRC and this guidance document.

[486] PEMSEA, Environmental Sensitivity Index (ESI) Atlas of the Gulf of Thailand, 2013. Available https://trove.nla.gov.au/work/208609045?q&versionId=228903188; accessed 8 Feb 2022

[487] IPIECA is an NGO and global oil and gas industry association for environmental and social issues. It was originally created in 1974 as the International Petroleum Industry Environmental Conservation Association before retiring the full name.

[488] ASEAN MOU. Available https://cil.nus.edu.sg/wp-content/uploads/formidable/18/2014-MoU-on-ASEAN-Cooperation-Mechanism-for-Joint-Oil-Spill-Preparedness-and-Response.pdf; accessed 8 Feb 2022. See also J Guevarra (2017) The Incoming Regional Response Regime in ASEAN, IOSC Proceedings 1:837-849. Available https://meridian.allenpress.com/iosc/article/2017/1/837/198071/THE-INCOMING-REGIONAL-RESPONSE-REGIME-IN-ASEAN ; accessed 8 Feb 2022 and J Guevarra (2014) The Global Initiative for Southeast Asia. International Oil Spill Conference Proceedings 1:1375–1387

2.2 Sensitive Marine Areas in fisheries activities

2.2.1 Background in international law

UNCLOS was negotiated in the 1970s with the intention of regulating states' rights and obligations with respect to all the uses of the oceans.[489] The activities discussed in this chapter are provided for in UNCLOS' provisions on fisheries in relation to both conservation and exploitation of living resources. The overriding objective for exploitation is that of a 'maximum sustainable yield' through the determination of allowable catch based on best scientific evidence, in order to avoid over-exploitation.[490] Although exploited living resources are the primary focus of these provisions, effects on species associated with or dependent upon harvested species must also be considered 'with a view to maintaining or restoring' their populations 'above levels at which their reproduction may become seriously threatened'.[491] The 1995 United Nations Fish Stocks Agreement (The Fish Stocks Agreement)[492] further implements the obligation in UNCLOS to protect and preserve the marine environment in the context of straddling and highly migratory fish stocks.

Specifically mentioned in the preamble to the Fish Stocks Agreement is

> the need to avoid adverse impacts on the marine environment, preserve biodiversity [and] maintain the integrity of marine ecosystems and minimize the risk of long-term or irreversible effects of fishing operations.

With these objectives in mind, the Fish Stocks Agreement also explicitly advocates the adoption

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[489] UNCLOS' preamble states that the Convention establishes a legal order for the seas and oceans. See the United Nations General Assembly Resolution 47/65 of 11 December 1992. Available http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/47/65; accessed 8 Feb 2022 and the presentation of UNCLOS by the United Nations Division for Ocean Affairs and the Law of the Sea. Available http://www.un.org/depts/los/convention_agreements/convention_overview_convention.htm; accessed8 Feb 2022. The comprehensiveness of UNCLOS and its pre-eminence in international law for all matters pertaining to the oceans are further discussed in Chapter 6 of this study.

[490] UNCLOS Article 61(2) and 61(3)

[491] UNCLOS Article 61(4)

[492] United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 4 August 1995, 2167 U.N.T.S. 88, 34 I.L.M. 1542 (entered into force on 11 December 2001) [UN Fish Stocks Agreement]

of the precautionary approach 'to ensure the conservation of such species and to protect habitats of special concern'.[493]

The 1995 Code of Conduct for Responsible Fisheries adopted by the FAO Conference[494] further recommends that states

- protect and rehabilitate 'all critical fisheries habitats in marine (…) ecosystems'; 'particular effort should be made to protect such habitats from destruction, degradation, pollution and other significant impacts resulting from human activities that threaten the health and viability of the fishery resources';
- take measures to ensure the use of selective and environmentally safe fishing gear and practices (including non-destructive fishing gear, closed seasons and areas) to minimise, *inter alia*, negative impacts on associated or dependent species and habitats and conserve the biodiversity of aquatic habitats.[495]

Following draft guidelines prepared by an FAO/APFIC expert workshop to address the challenges of overcapacity, overexploitation and unsustainable practices faced by fisheries in Asia,[496] the Asia-Pacific Fisheries Commission (APFIC) endorsed the 2014 APFIC Regional Guidelines for Responsible Tropical Trawl Management.[497] These APFIC Trawl Guidelines highlight the importance to identify and integrate into fishery management plans key habitats, such as spawning and nursery areas and other sensitive habitats, to minimise trawling effects on sensitive benthic habitats. Possible measures include spatial closures

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[493] UN Fish Stocks Agreement Articles 5(c) and (g) and 6(3)(d)

[494] The FAO Conference is composed of representatives of Member States to the 1945 Constitution of the Food and Agriculture Organization of the United Nations; The FAO Conference has 194 Member States (including all the littoral States of the SCS; China, Indonesia, Philippines and Thailand are also one of the 49 Members of the FAO Council, the executive body of the FAO). Available http://www.fao.org/unfao/govbodies/gsbhome/conference/en/; accessed 8 Feb 2022

[495] FAO Code of Conduct for Responsible Fisheries Articles 6(8), 7(2)(2), 7(6)(9), 7(6)(10), 8(4)(7) and 12(10). Available https://www.fao.org/3/v9878e/V9878E.pdf; accessed 8 Feb 2022

[496] APFIC Regional Guidelines for the Management of Tropical Trawl Fisheries in Asia, APFIC/FAO Regional Expert Workshop, Phuket-Thailand, 30 September-4 October 2013, RAP Publication 2014/01. Available http://www.fao.org/3/a-i3575e.pdf; accessed 8 Feb 2022

[497] FAO, Report of the 33rd Session of the APFIC, Hyderab, 23-25 June 2014, RAP Publication 2014/18. Available http://www.fao.org/3/a-i4010e.pdf; accessed 8 Feb 2022. All the littoral States of the SCS were present except Brunei, China and Singapore. Brunei and Singapore are not members of the APFIC

which require prior identification, mapping and prioritisation of ecosystems and critical (benthic) habitats. Critical habitats to be focused on include any particularly sensitive area and areas where endangered species interactions occur. Sensitive areas include seagrass, mangroves and nursery areas.[498]

2.2.2 Vulnerable Marine Ecosystems in Areas Beyond National Jurisdiction

2.2.2.1 Legal background

In the context of the depletion of deep-sea fish stocks in the high seas, the FAO developed the concept of Vulnerable Marine Ecosystems (VMEs) in response to repeated calls by the UNGA. Gjerde (2018) traces the origin of these UNGA resolutions and subsequent development of VMEs to a 2001 expert workshop organised by two deep sea scientists to explore ways 'to protect vulnerable species, habitats and long-term research sites from expanding human uses in the deep and open ocean beyond national boundaries'.[499] In February 2003, UNGA Resolution 57/141 recommended that the topic of 'protecting vulnerable marine ecosystems' be used to frame discussions of the UN Informal Consultative Process on Oceans and Law of the Sea (UNICPOLOS).[500] In the subsequent UNGA Resolution on Oceans and Law of the Sea, the concern with 'vulnerable marine ecosystems' makes its way onto the second page of the resolution and is repeated six times, including in the heading of

[498] APFIC Regional Trawl Guidelines, supra note 497

[499] Gjerde also highlights the importance of prior scientific assessments by the International Council for Exploration of the Seas (ICES) which highlighted the issues faced by deep sea habitats damaged by fishing practices in the late 90s. K Gjerde, Perspectives on a developing regime for marine biodiversity conservation and sustainable use beyond national jurisdiction, in Ocean Law Debates – The 50-year legacy and emerging issues for the years ahead, HN Scheiber, N Oral and MS Kwon (eds), Brill Nijhoff, Leiden, Boston, 2018: 354-380 [358, 360]

[500] UNGA A/RES/57/141, 21 February 2003 [para. 62]. Available https://documents-dds-ny.un.org/doc/UNDOC/GEN/N02/547/54/PDF/N0254754.pdf?OpenElement; accessed 8 Feb 2022. This UNGA meeting also followed closely the 2002 Johannesburg World Summit on Sustainable Development to which it refers several times, and resulted in a Plan of Implementation including the maintenance of 'the productivity and biodiversity of important and vulnerable marine and coastal areas'. Available http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/WSSD_PlanImpl.pdf; accessed 8 Feb 2022

Part X 'Marine environment, marine resources and the protection of vulnerable marine ecosystems'.[501]

The November 2003 UNGA Resolution on Sustainable Fisheries requested the Secretary-General, in close cooperation with the FAO, and 'in consultation with states, regional and sub-regional fisheries management organisations and arrangements and other relevant organisations, in his next report concerning fisheries to include a section outlining current risks to the marine biodiversity of vulnerable marine ecosystems including, but not limited to, seamounts, coral reefs, including cold water reefs and certain other sensitive underwater features, related to fishing activities'.[502] Since then these concerns have been reiterated in each annual resolution on Oceans and the Law of the Sea and Sustainable Fisheries with increasingly compelling, specific and pressing language for measures to be taken to identify vulnerable marine ecosystems, monitor activities and their impacts and take measures to prevent adverse impacts, including closure of areas to fishing.[503]

As the lead competent international organisation for fisheries, the FAO developed a new Deep-Sea High Seas programme.[504] The first outcome was the adoption of the 2008 FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas (FAO Deep-Sea Guidelines),[505] which aim to assist states and RFMO/As in sustainably managing

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[501] UNGA A/RES/58/240, 5 March 2004. Available https://documents-dds-ny.un.org/doc/UNDOC/GEN/N03/508/92/PDF/N0350892.pdf?OpenElement; accessed 8 Feb 2022

[502] UNGA A/RES/58/14, 21 January 2004 [para. 46]. Available https://documents-dds-ny.un.org/doc/UNDOC/GEN/N03/453/75/PDF/N0345375.pdf?OpenElement; accessed 8 Feb 2022

[503] Notoriously, UNGA A/RES/61/105, 8 December 2006, calls on RFMO/As to adopt and implement measures for their respective regulatory areas as a matter of priority but not later than 31 December 2008 and to assess, on the basis of the best scientific information, whether individual bottom fishing activities would have significant adverse impacts on vulnerable marine ecosystems and to identify vulnerable marine ecosystems [para. 83]. Available https://undocs.org/A/RES/61/105; accessed 8 Feb 2022. Previously, UNGA A/RES/59/25 [13], calls upon members of RFMO/As to regulate bottom fisheries and the impacts of fishing on vulnerable marine ecosystems; in areas where there are no RFMO/As, it calls on States to establish such RFMO/As in order to take these measures. Available https://undocs.org/en/A/RES/59/25; accessed 8 Feb 2022. UNGA A/RES/60/31, 10 March 2006, calls on States to accelerate their implementation of appropriate conservation measures including spatial and temporal measures. Available https://undocs.org/en/A/RES/60/31; accessed 8 Feb 2022.

[504] Description of the FAO's work in the Deep-Sea High Seas is available http://www.fao.org/fishery/topic/16160/en; accessed 8 Feb 2022

[505] Report of the FAO Workshop for the Development of a Global Database for Vulnerable Marine Ecosystems, Rome 7-9 December 2011, FAO Fisheries and Agriculture Report No. 1018. Available http://www.fao.org/docrep/017/i3109e/i3109e.pdf; accessed 8 Feb 2022

deep-sea fisheries, especially with respect to the conservation and management of VMEs. [506] The FAO Deep-Sea Guidelines define VMEs and provide criteria for their identification. A web-based platform on VMEs was subsequently developed to support RFMO/As with identifying and managing VMEs and provide a global outlook. [507] The global VME database provides an inventory of fisheries measures adopted in ABNJ to prevent significant adverse impacts of bottom fisheries on VMEs.[508]

In the context of the exploitation of marine living resources, another instrument which established protected areas to conserve endangered species is the International Convention for the Regulation of Whaling (ICRW), whose objective is the conservation and management of whale stocks.[509] Sanctuaries where commercial whaling is prohibited were designated by the International Whaling Commission (IWC) in 1979 in the Indian Ocean and in 1994 in the Southern Ocean around Antarctica.[510] However, no clear scientific criteria appear to have been developed by the IWC to designate such sanctuaries, despite discussions on this topic.[511] The criteria developed to identify IMMAs may prove useful in this respect.[512]

To note, the focus of the ICWR on conserving endangered species and therefore preventing their extinction also meets the objective of the CBD. The relationship between the protection of endangered species and biodiversity are discussed in Chapters 3, 4 and 6 below.

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[506] 2009 FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas (FAO Deep-Sea Guidelines) [para. 6]. Available http://www.fao.org/in-action/vulnerable-marine-ecosystems/background/deep-sea-guidelines/en/; 8 Feb 2022

[507] Database available at http://www.fao.org/in-action/vulnerable-marine-ecosystems/en/; accessed 8 Feb 2022

[508] Also of note are the 2011 FAO Technical Guidelines for Responsible Fisheries No 4: Marine Protected Areas and Fisheries. They provide information and guidance on the use of MPAs in the context of fisheries and include VMEs. Available http://www.fao.org/docrep/015/i2090e/i2090e.pdf; accessed 8 Feb 2022

[509] International Convention for the Regulation of Whaling, 2 December 1946, 161 U.N.T.S. 72 (entered into force on 10 November 1948) [1946 Whaling Convention], Article 5. The International Whaling Commission (IWC) was created by the 1946 Whaling Convention to regulate commercial whaling with the advice of its Scientific Committee. However, in 1982, it decided to pause whaling (the 'whaling moratorium'). For further details on the stalemate between pro-whaling and anti-whaling nations and impacts on this treaty regime, see A Telesetsky and S Lee (2015) After Whaling in the Antarctic: Amending Article VIII to Fix a Broken Treaty Regime, The International Journal or Marine and Coastal Law 30:700-726 and T Jordan (2012) Revising the International Convention on the Regulation of Whaling: A Proposal to End the Stalemate within the International Whaling Commission, Wisconsin International Law Journal 29: 833-867

[510] See IWC/66/08, The South Atlantic: A Sanctuary for Whales (Available https://iwc.int/sanctuaries; accessed 8 Feb 2022) and the report of the 66th meeting of the IWC recounting the insufficient support for the application (Available https://archive.iwc.int/pages/search.php?search=%21collection29604; accessed 8 Feb 2022). A revised proposal has been again rejected at the subsequent meeting (IWC67 in 2018)

[511] See the joint proposal for a Whale Sanctuary in the South Atlantic by Argentina, Brazil, South Africa and Uruguay to the 65th Annual Meeting of the International Whaling Commission (September 2014).

[512] Supra Chapter 1 Section 1.4.2 and 1.4.3

2.2.2.2 Adoption

As of 21 May 2021, UNCLOS has 168 parties (including the European Union (EU)), and 92 are a party to the Fish Stocks Agreement (including the EU). UNCLOS was adopted by all but one of the SCS littoral states. The Fish Stocks Agreement was recently adopted by three coastal and fishing states bordering the SCS (Table 2.9), bringing the total to five. China is the only important fishing littoral state to not be a party. Given the threats posed by IUU Fishing in Southeast Asia,[513] and the strong stand taken by Indonesia on this topic,[514] it is possible that these recent adoptions will trigger changes in the regional management of fisheries.

Table 2.9: Status of adoption of the Fish Stocks Agreement by

Littoral states of the SCS	Adoption UNCLOS[515]	Adoption Fish Stocks Agreement
Brunei Darussalam	1996	-
Cambodia	-	2020
China	1996	-
Indonesia	1986	2009
Malaysia	1996	-
Philippines	1984	2014
Singapore	1994	-
Thailand	2011	2017
Vietnam	1994	2018

[513] On 3 August 2016, Southeast Asian countries (all the coastal states of the SCS except China) have signed a Joint Declaration pledging to combat IUU fishing. Available https://asean.org/wp-content/uploads/2017/11/ASEAN-Documents-Series-2016-Final.pdf; accessed 8 Feb 2022

[514] See for instance P Parameswaran (2017) Indonesia Wants Global War on Illegal Fishing, The Diplomat 9 May 2017. Available https://thediplomat.com/2017/05/indonesia-wants-global-war-on-illegal-fishing/; accessed 8 Feb 2022. Indonesia's strong position was also demonstrated at the United Nations Ocean Conference on 5-9 June 2017 where the delegation made several declarations including a call on the UNGA to acknowledge that IUU fishing is a transnational crime. Indonesia also co-sponsored a side-event on 'Implementation and Application of the Port State Measures Agreement to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing'. Available https://oceanconference.un.org/index.php?page=view&type=20000&nr=1934&menu=3327; accessed 8 Feb 2022

[515] Date of ratifications of, accessions and succession to the Fish Stocks Agreement. Available http://www.un.org/depts/los/reference_files/chronological_lists_of_ratifications.htm#Agreement for the implementation of the provisions of the Convention of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks; accessed 29 Jan 2018

The application in the SCS of the FAO Guidelines for deep-sea fisheries beyond national jurisdiction may be questioned. However, it is arguable that the Guidelines may be relevant for two main reasons. First, although the maritime zones and boundaries in the SCS are disputed,[516] the SCS Arbitral Award states that no island in the Spratly area is capable of generating a continental shelf of its own and an EEZ. Application of this ruling would leave high seas pockets in the SCS, as maritime zones from above-water features would not cover the entire sea area between the outer boundaries of the EEZ from opposite littoral states in the SCS. [517] (Figure 2.1 below) Second, even if there were only very small areas of high seas, the rules adopted for high seas fisheries are relevant within national jurisdiction based on the rule of compatibility of conservation and management measures provided for in the Fish Stocks Agreement. Article 7(2) provides that

> *conservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of the straddling fish stocks and highly migratory fish stocks in their entirety.*

This is particularly relevant in the SCS where numerous shallow and deep seamounts are expected to be overexploited fishing grounds[518] and the deeper ones may potentially qualify as VMEs (although this depends on the type of species being exploited – see criteria below). However, the Deep-Sea Guidelines are designed for implementation by RFMO/As and no such body has been established to date for the SCS.[519] It is important to note here that the ASEAN-

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[516] See supra Section 1.2 in the introduction and note 34

[517] Map attached to Y Lyons, LQ Hung and P Tkalich (2018) Determining High Tide Features (or Islands) in the SCS Under Article 121(1): A Legal and Oceanography Perspective, in The SCS Arbitration: The Legal Dimension, S Jakakumar et al (eds): 128-153. Available https://cil.nus.edu.sg/wp-content/uploads/2016/12/Session-4-on-High-Tide-Features-Youna-Lyons.pdf;
accessed 8 Feb 2022

[518] The destructive fishing practices observed and reported on shallow reefs suggest that deeper seamounts are subject to the same treatment. However, evidence of this is more difficult to establish and therefore to stop. See for instance R Bale (2016) Giant Clam Poaching Wipes out Reefs in SCS, National Geographic, 12 July 2016. Available https://news.nationalgeographic.com/2016/06/south-china-sea-coral-reef-destruction/; accessed 8 Feb 2022

[519] See the views of Franckx, on this while noting that his article was written before recent adoption of the Fish Stocks Agreement by Philippines and Thailand. E Franckx (2012) Fisheries in the SCS: A Centrifugal or Centripetal Force, Chinese Journal of International Law 11: 727-747. See also DT Nguyen (2012) Fisheries Cooperation in the SCS and the (Ir)Relevance of the Sovereignty Question, Asian Journal of International Law 2: 59-88. Available https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1871314; accessed 8 Feb 2022; SM Kao et al (2012) Regional Cooperation in the SCS: Analysis of Existing Practices and Prospects, Ocean Development and International Law 43: 283-295

SEAFDEC Guidelines on Responsible Fisheries apply in any case in the SCS and contain provisions for fisheries refugia discussed in section 2.2.3 below.

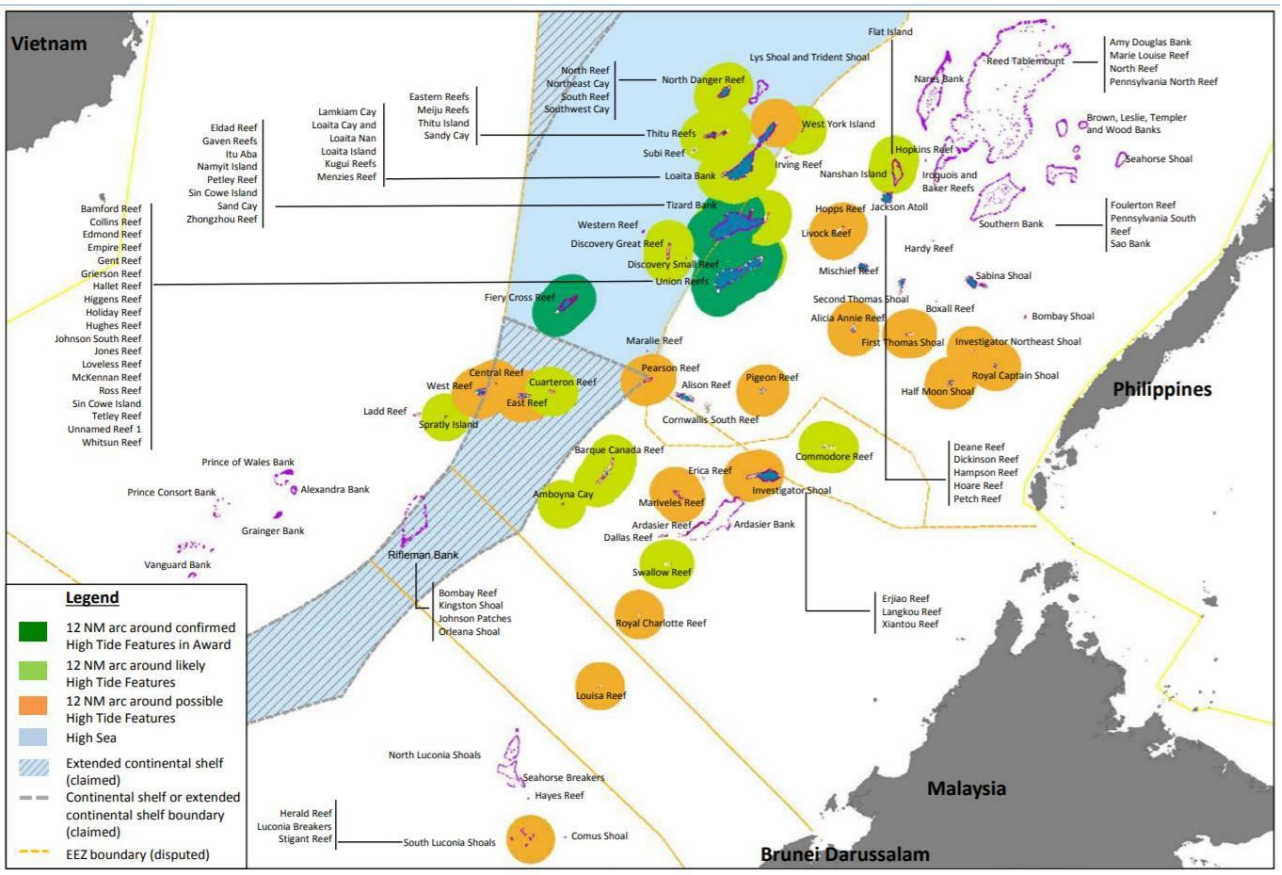

Figure 2.1: Map of the Spratly area with a projected 12NM arc around features that may qualify for a Territorial Sea under UNCLOS, on the basis of the findings of the SCS Arbitration Award

2.2.2.3 Scientific criteria

According to the Deep-Sea Guidelines, the vulnerability of a potential VME should be assessed on the basis of

> the likelihood that a population, community or habitat will experience substantial alteration from short-term or chronic disturbance, and the likelihood that it would recover and in what time frame.

VME features may be physically or functionally fragile. The most vulnerable ecosystems are those that are 'both easily disturbed and slow to recover or may never recover'. The guidelines

also indicate that the vulnerability should be assessed for specific threats.[520]

Also important is that these guidelines were developed for fisheries that occur in ABNJ and have the following characteristics:

- they include species that can only sustain low exploitation rates;
- the fishing gear is likely to contact the sea floor during normal operations.[521]

Table 2.10: Criteria for the identification of VMEs

	Criterion[522]	Description	Examples
1	Uniqueness or rarity	Rare area or ecosystem or contains rare species	Habitats containing endemic species or threatened or endangered species or nurseries, discrete feeding, breeding, spawning areas, etc.
2	Functional significance of the habitat	Discrete areas or habitats necessary for the survival, function, spawning, recovery, particular life-history stages or of rare threatened or endangered species	
3	Fragility	Highly susceptible to degradation by anthropogenic activities	
4	Life-history traits of component species that make recovery difficult	Populations or assemblages of species with either slow growth rate, late maturity, long or unpredictable recruitment or long-lived	
5	Structural complexity	Complex physical structures created by significant concentrations of biotic and abiotic features; ecological processes highly dependent on these structures	Often systems with high diversity which is dependent on the structuring organisms

The management and conservation steps include the identification of VMEs and assessment of significant adverse impacts; a non-exhaustive list of five alternative criteria is set out. (Table

[520] Deep-Sea Guidelines, paras. 14 and 15

[521] Deep-Sea Guidelines, para. 8

[522] Deep-Sea Guidelines, para. 42

2.10)[523] According to the Deep-Sea Guidelines, examples of potentially vulnerable species groups, communities and habitats include certain cold-water corals, sponge dominated communities, and seep and vent communities comprised of invertebrate and microbial species found nowhere else.[524] Thus, areas of cold-water corals found on seamount edges in the SCS[525] could potentially be VME candidates, if all the other criteria are met.

Noteworthy is that none of these criteria refer expressly to biological diversity, except as a common (but not necessary) trait of criterion 5, structural complexity; EBSA criteria of biological productivity and naturalness are not included either. With respect to biodiversity, Ardron et al state that 'most areas designated as VMEs have been assessed based on their density as well as biodiversity' and that 'expert reviews by the CBD and FAO have concluded that similar data can be used for both VME and EBSA criteria'.[526] However, it is possible that an area that theoretically qualifies as an EBSA under the CBD may not qualify as a VME, such that adverse impacts from fishing on such an area would not fall within the scope of the VME management framework.[527]

In such a situation, it may be observed that the FAO may not provide means to avoid adverse impacts from fisheries on areas identified as EBSAs, whereas shipping could be restricted if it would have adverse impacts on these areas.[528] This point may, however, be theoretical as the demonstration that direct adverse effects on a seafloor habitat that can only be attributed to

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[523] For a discussion of possible improvement of the identification and management process, see JA Ardron (2014) A Systematic Approach Towards the Identification and Protection of Vulnerable Marine Ecosystems, Marine Policy 49: 146-154. See also PJ Auster (2011) Definition and detection of Vulnerable Marine Ecosystems on the High Seas: Problems with the 'Move-On' rule, ICES Journal of Marine Science 68: 254-264

[524] Deep-Sea Guidelines, Annex

[525] On deep-water corals found in the SCS, supra Part 2 Chapter 5 Section 5.1.7 and notes 897 to 901

[526] Ardron (2014), supra note 524

[527] D Johnson et al, ATLAS Deliverable 7.2 Report on Priorities for an Expert Assessment of North Atlantic MPAs, EBSAs and VMEs in ABNJ' (27 September 2017). Available https://zenodo.org/record/997986#.WtmgJq17HMU; accessed 28 May 2018. This paper contributes to the EU H2020 ATLAS project. The Atlas-EU Project is a Trans-Atlantic assessment and deep-water ecosystem-based spatial management plan for Europe. Available www.eu-atlas.org/about-atlas/atlas-work-package-descriptions; accessed 28 May 2018

[528] See further comparison between suites of scientific criteria and corresponding discussion in Part 1 Chapter 3 Section 3.1 and Part 2 Chapter 4 Section 4.2

shipping activities may be generally more challenging to establish in deep-water areas. Although adverse effects from underwater noise may come to mind, the science demonstrating its effects is still developing.

The FAO VME database shows some VMEs that are closed to fishing under the management of different RFMOs. However, large areas of ocean are not covered, including large parts of the Atlantic, Indian and Pacific Oceans.[529]

2.2.2.4 Listing procedure, reporting, monitoring and review process

The FAO serves as a repository of information and as a training and outreach centre for RFMO/As charged with managing fisheries beyond national jurisdiction. According to the Deep-Sea Fisheries Guidelines, RFMO/As should develop, adopt and publish standardized and consistent data collection procedures and protocols for all stages of fishery development and activities. The data must be at a sufficiently fine scale to assess stock status and fisheries impacts on VMEs.[530] These data must also be communicated to the FAO.

2.2.2.5 Restricted activities

The Deep-Sea Fisheries Guidelines also provide for precautionary conservation and management measures (including stages in the development of deep-sea fisheries to ensure that they do not result in significant adverse impact on VMEs) and the development of a fishery management plan (including biological reference points for stock assessment and management).[531] The latter must include enforcement and compliance mechanisms. Flag states and RFMOs are also expected to conduct risk assessments of fishing to establish whether it is likely to produce significant adverse effects in a given area according to

[529] For a review of the status of closures, see G Wright et al (2015) Advancing Marine Biodiversity Protection through Regional Fisheries management: A Review of Bottom Fisheries Closures in Areas Beyond National Jurisdiction, Marine Policy 61:134 148.

[530] Deep-Sea Guidelines, paras. 30-41

[531] Deep-Sea Guidelines, paras. 21-29 and 61-80

clear scoping and guidance.[532] Fisheries measures that are contemplated to achieve long-term conservation and sustainable use of deep-sea fish stocks include:

- effort and/or catch controls,
- temporal and spatial restrictions or closures,
- changes in gear design and/or deployment or operational measures,
- effective bycatch-reduction devices.[533]

These Deep-Sea Fisheries Guidelines are comprehensive and protective. However, they are recent and involve contemporary issues in ocean science, law and policy, understanding of which is still developing.[534] Future assessments of effectiveness in the implementation by states and RFMOs will determine whether they need amendment and are complied with. The same is true of the criteria for identification of VMEs, whose description could evolve in an attempt to clarify the relationship between different suites of scientific criteria developed under different instruments and avoid irreversible effects on sensitive areas from some activities which would not be restricted while others are.

2.2.3 Fisheries Refugia in Southeast Asia

2.2.3.1 Legal background

The initial set of Regional Guidelines for Responsible Fisheries in Southeast Asia resulted from the decision of the SEAFDEC Council[535] to develop a program for the regionalisation of the FAO

[532] Deep-Sea Guidelines, paras. 47-53. Significant adverse impacts are defined as those that 'compromise ecosystem integrity (i.e., ecosystem structure and function) in a manner that: (i) impairs the ability of affected populations to replace themselves; (ii) degrades the long-term natural productivity of habitats; or (iii) causes, on more than a temporary basis, significant loss of species richness, habitat or community types. Impacts should be evaluated individually and cumulatively. Deep-Sea Guidelines, para. 17

[533] Deep-Sea Guidelines, para. 71

[534] This is well demonstrated by the discussions in Ardron (2014), supra note 524 and Wright et al (2015) supra note 530

[535] The Southeast Asian Fisheries Development Centre (SEAFDEC) is an inter-governmental body created in 1967 that fosters cooperation between governmental agencies responsible for fisheries. All ASEAN Member States are a Member of SEAFDEC, as well as Japan who provided funding since its establishment. SEAFDEC and the ASEAN have signed a Letter of Understanding on the ASEAN-SEAFDEC Strategic Partnership (ASSP) on 2 Nov 2007. Although SEAFDEC is a non-ASEAN intergovernmental body, its work is influential for ASEAN fisheries cooperation as they are developed by ASEAN member states and some of them have also been adopted by ASEAN.

Code of Conduct for Responsible Fisheries and included four sets of guidelines[536] (together, the four sets are generally referred to as the SEAFDEC Regional Guidelines for Responsible Fisheries). They include:[537]

- Responsible Fishing Operations;[538]
- Responsible Aquaculture;
- Responsible Fisheries Management; [539]
- Responsible Post-harvest Practices and Trade. [540]

The third set, 'SEAFDEC Guidelines for Responsible Fisheries Management', was published in 2003 and includes numerous measures for effective responsible fisheries management.[541] It was later completed by the ASEAN-SEAFDEC Supplementary Guidelines for Responsible Fisheries in Southeast Asia which are divided into another four distinct sub-sets of supplementary guidelines.[542] The fourth sub-set of these Supplementary Guidelines includes

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[536] On the FAO Code of Conduct for Responsible Fisheries, see section 2.2 above. Used in this context, the term 'fisheries' includes all harvest of living resources either through capture of wild stocks or aquaculture on land and at sea.

[537] All sets of guidelines are available http://www.seafdec.org/downloads/regional-guidelines/; accessed 16 Feb 2022

[538] This was the first set to be published, in 1999. They include guidelines on numerous aspects of fishing operations, as does the FAO Code of Conduct which forms the basis for the regional guidelines.

[539] SEAFDEC Regional Guidelines for Responsible Fisheries Management in Southeast Asia. Available http://www.seafdec.org/download/rccrf-responsible-fisheries-management/; accessed 16 Feb 2022

[540] Measures included in these Guidelines include effective monitoring, surveillance, control and enforcement to obtain compliance, elimination of excess fishing capacity and unauthorised fishing and fishing practices, conservation and management measures focused on ecosystems rather than only target stocks, ecosystem-based management, compatibility of measures within and beyond national jurisdiction for highly migratory and straddling fish stocks, best scientific evidence and the precautionary approach. SEAFDEC Guidelines for Responsible Fishing Operations, supra note 537

[541] SEAFDEC Guidelines for Responsible Fisheries Management in Southeast Asia, supra note 537

[542] The Regional Guidelines for Responsible Fisheries have been adopted on the basis of regionally agreed technical suggestions on the various issues. They are referred to in annual reports and recommendations of SEAFDEC's Council as are Fisheries Refugia. Guidelines available http://repository.seafdec.org/handle/20.500.12066/41or http://203.177.46.133/handle/20.500.12066/1077; accessed 16 Feb 2022. See, for example, the 50th Meeting of the Council of SEAFDEC, 26-30 March 2018. Available http://repository.seafdec.org/handle/20.500.12066/1362; accessed 16 Feb 2022. The set of guidelines titled 'Supplementary Guidelines on Co-Management Using Group User Rights, Fishery Statistics, Indicators and Fisheries Refugia' include Regional Guidelines for: (1) Co-Management using Group User Rights for Small-Scale Fisheries in Southeast Asia, (2) Fishery Statistics for Capture Fisheries in Southeast Asia, (3) Use of Indicators for the Sustainable Development and Management of Capture Fisheries in Southeast Asia; and, (4) Use of Fisheries Refugia for Capture Fisheries Management in Southeast Asia. Available http://www.unepscs.org/Refugia_Training/Fisheries%20Refugia%20Concept/11-ASEAN-SEAFDEC-Regional-Guidelines-on-the-Use-of-Fisheries-Refugia.pdf; accessed 16 Feb 2022

elements relevant to the identification of sensitive areas for fisheries and is titled 'Use of Fisheries Refugia for Capture Fisheries Management' (Guidelines on Fisheries Refugia). These Guidelines on Fisheries Refugia were developed in the context of the fisheries component of the UNEP-GEF project entitled 'Reversing Environmental Degradation Trends in SCS and Gulf of Thailand' (the UNEP-GEF SCS Project) through joint meetings started in September 2006.[543] This work involved a collaborative effort between the Regional Working Group on Fisheries of the UNEP-GEF SCS Project and SEADEC, the FAO, the WorldFish Centre and the IUCN. It was completed in 2009.[544] This work was given legitimacy, authority and publicity by its publication as a part of the ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries and Identification of Fisheries Refugia.

The ASEAN and SEAFDEC's collaboration, which began in 1998, led first to the ASEAN- SEAFDEC 2001 Resolution and Plan of Action on Sustainable Fisheries for Food Security.[545] Subsequently, the cooperation was further formalised through a Letter of Understanding for ASEAN-SEAFDEC Strategic Partnership (ASSP) in 2007.[546] In 2011, ASEAN and SEAFDEC hosted a similar conference on fisheries, now involving the FAO and other international and regional organisations and development agencies, where the ASEAN-SEAFDEC Ministers[547] adopted a three-page resolution referring to the FAO Code of Conduct for Responsible Fisheries and the Regional Guidelines on Responsible Fisheries in Southeast Asia, as well as further support for continued implementation of the 2001 Plan of Action.[548] The Strategic Plan of Action for

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[543] Participating States in the UNEP-GEF SCS Project were Cambodia, China, Indonesia, Malaysia, Philippines, Thailand and Vietnam. The fisheries component of the project (to which China did not participate) 'Over Exploitation of Fisheries in the Gulf of Thailand' led to the creation of a Regional Working Group on Fisheries and the development of work of fisheries refugia. SEAFDEC appears to have continued the work after the official completion of the SCS Project as it held a Regional Technical Meeting on Fisheries Resource Enhancement on 24-26 April 2018. See C Paterson and W Yingyuad (2018), SEAFDEC/UNEP/GEF Establishment and Operation of a Regional System of Fisheries Refugia in the SCS and Gulf of Thailand. Available https://iwlearn.net/iw-projects/5401; accessed 7 Mar 2022

[544] CJ Paterson et al (2013) Fisheries Refugia: A Novel Approach to Integrating Fisheries and Habitat Management in the Context of Small-Scale Fishing Pressure, Ocean and Coastal Management 85: 214-229

[545] Available http://repository.seafdec.org/handle/20.500.12066/1281; accessed 16 Feb 2022

[546] 29th Meeting of ASEAN Ministers on Agriculture and Forestry

[547] From Brunei Darussalam, Indonesia, Japan, Thailand, Lao, Malaysia, Myanmar, Philippines, Singapore and Vietnam. ASEAN-SEAFDEC (2011) Proceedings of the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 [205-207]. Available http://repository.seafdec.org/bitstream/handle/20.500.12066/1075/Proceedings%20Volume1.pdf?sequence=1&isAllowed=y; accessed 17 Feb 2022

[548] ASEAN-SEAFDEC (2011) Proceedings of the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020, ibid

ASEAN Cooperation on Fisheries (2016-2020) also refers to the ASEAN-SEAFDEC Guidelines on Fisheries and to SEAFDEC and FAO as key partners in the implementation.[549]

The Guidelines on Fisheries Refugia build on provision 7.6.4 ADD.1 (8) of the SEAFDEC Guidelines on Responsible Fisheries Management:

> States should consider area or seasonal closure to protect critical stages of life cycles of fisheries resources,

provided for in the context of state measures to prevent unauthorized fishing and eliminate the use of illegal and destructive fishing gear and practices.[550]

The introduction to the Guidelines highlights how the UNEP-GEF SCS Project demonstrated the critical role of coastal and marine habitats in sustaining the productivity of regional fisheries, especially coral reefs, seagrass, mangrove and wetland habitats. Maintenance of natural refugia, or creation of refugia in cases where natural refugia no longer exist, was therefore determined to be an important priority for the management of fisheries in the ASEAN region. Fisheries Refugia are defined as

> Spatially and geographically defined, marine or coastal areas in which specific management measures are applied to sustain important species [fisheries resources] during critical stages of their life cycle, for their sustainable use.[551]

Such areas are comprised of spawning and nursery grounds, as well as spawning aggregations, migratory routes, and areas of habitat required for the maintenance of broodstock.[552] In terms of priorities, the Guidelines recommend to prioritise the identification of spawning refugia for important pelagic species[553] and juvenile refugia for demersal species.[554] Appendix 3 lists areas proposed as meeting these criteria and discussed in 2006 and 2008 in the context of the collaboration of the UNEP-GEF SCS Project with SEAFDEC. They are generally coastal areas in

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[549] For more information on this initiative, see the Introduction Section 1.1 on the ASEAN and SEAFDEC and note 15

[550] Supra notes 538 to 543

[551] Guidelines on Fisheries Refugia (2006) [para. 27], supra note 543

[552] Guidelines on Fisheries Refugia [para. 28], supra note 543

[553] To prevent overfishing

[554] To prevent growth overfishing, i.e., overfishing of juveniles and other non-mature fish

the territorial sea and EEZ of SCS littoral states who participated in the UNEP- GEF SCS Project. Fisheries Refugia in Brunei Darussalam, China and Singapore are therefore not included.

2.2.3.2 Expected measures and recent developments

Fisheries closure is not the only recommended fisheries management measure for Fisheries Refugia. The Guidelines recommend that some areas within refugia be permanently closed based on their critical importance to the life cycle of a species or group of species. Other measures include restrictions on gear, vessel size and capacity, seasonal restrictions and other access limitations; measures therefore depend on species or groups of species concerned.[555]

SEAFDEC was the coordinator of a four-year (2016-2020) GEF-funded project focusing on the establishment and operation of a regional system of Fisheries Refugia in the SCS and Gulf of Thailand with Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam as participating countries.[556] This project was also designed to facilitate the delivery of the fisheries component of the ASEAN Strategic Action Programme (SAP) for the SCS. Lists of candidate Fisheries Refugia were established in the context of the UNEP-GEF SCS Project (primarily coral reef, seagrass and spawning areas), as well as lists of migratory and straddling stocks in Southeast Asia.[557] The project was extended to 30 Dec 2022 to pursue the

[555] Guidelines on Fisheries Refugia, supra note 543

[556] The project was launched in November 2016. Details of the project and endorsement by SEAFDEC Council are described in the 49th Meeting of the Council of SEAFDEC, 3-7 April 2017. GEF Project Identification Form is available https://www.thegef.org/project/establishment-and-operation-regional-system-fisheries-refugia-south-china-sea-and-gulf; accessed 17 Feb 2022. Substantive report of the UNEP-GEF Project, Strategic Action Programme for the SCS, 25 August 2008, is available https://iwlearn.net/documents/6073; accessed 17 Feb 2022. It includes a proposed framework for management of the marine environment in the SCS, including Fisheries Refugia

[557] Information Collated by the Fisheries and Habitat Components of the SCS Project on Sites Important to the Lifecycles of Significant Fish Species, submitted at the 8th Meeting of the Regional Working Group for the Fisheries Component of the UNEP/GEF Project. UNEP/GEF/SCS/RWG-F. 8.5, 12 October 2006. This list was later updated in Inventory of Known Spawning and Nursery Areas for Economically Important Gish Species in the SCS and Gulf of Thailand, 10th Meeting of the Regional Working Group for the Fisheries Component of the UNEP/GEF Project. UNEP/GEF/SCS/RWG-F.10/7, 15 May 2008. See also the Fisheries Refugia Sites page of the UNEP=GEF SCS Project. Available http://refugia.unepscs.org/Fisheries_Refugia_Information/About_Fisheries_Refugia/Fisheries_Refugia_Sites.html; accessed 17 Feb 2022

implementation of Fisheries Refugia.[558] Following the identification of pilot sites, Fisheries Refugia Priority Sites were adopted with an objective of habitat linkages and connectivity. They focus on ten commercially valuable target species that are also of regional significance.[559]

When comparing the criteria established to identify VMEs beyond national jurisdiction and to define Fisheries Refugia in Southeast Asia, there is no apparent reason for Fisheries Refugia for pelagic species to not (theoretically) qualify as VMEs, based on the criterion of functional significance of the habitat. However, the opposite might not be true, as other areas than those that support critical stages of commercial species' life cycle may qualify as a VME and not as Fisheries Refugia under the ASEAN-SEAFDEC Guidelines on Fisheries Refugia.

2.3 Sensitive marine areas in the context of deep seabed mining in the Area: Areas of Particular Environmental Interest in the Clarion-Clipperton Zone

2.3.1 Legal background

Rights to the Area and its resources are 'vested in mankind as a whole, on whose behalf the Authority shall act'.[560] The International Seabed Authority (ISA) has the responsibility to organise, regulate and control exploration and exploitation of seabed minerals in the Area.[561] Its mandate includes the adoption of necessary measures to ensure effective protection of the marine environment from harmful effects which may arise from deep seabed mining. [562]

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[558] Extension documents available online https://www.thegef.org/projects-operations/projects/5401 and http://repository.seafdec.or.th//handle/20.500.12067/861; accessed 17 Feb 2022. See also the report of the 6th Ad-hoc Meeting of the Project Steering Committee, 30 November 2021. Available http://repository.seafdec.or.th/handle/20.500.12067/1746; accessed 17 Feb 2022

[559] Transboundary sites adopted so far are for the Short Mackerel (through sites in Cambodia, Thailand and Vietnam); the Blue Swimming Crab (sites in Cambodia and Thailand) and the Frigate Tuna (sites in the Philippines and Vietnam). See Southeast Asia: Fish Bank of the World. Available https://fisheries-refugia.org/235-refugia-news-fishbank-080621; accessed 17 Feb 2022

[560] UNCLOS Article 137(2)

[561] UNCLOS Articles 136, 137 and 153, as amended by the 1994 Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, 28 July 1994, 1836 U.N.T.S. 3

[562] UNCLOS Articles 145 and 162, as amended by the 1994 Agreement

In this capacity, the ISA is developing a Mining Code which includes provisions for the protection of the marine environment, one of whose components is marine biodiversity. Applicants for deep seabed exploration must submit a programme for oceanographic and environmental baseline studies and a preliminary environmental impact assessment of the potential effects of exploration activities.[563] The ISA must also ensure that the proposed plan of work for exploration provides for effective protection and preservation of the marine environment including, but not restricted to, the effect on biodiversity and that adequate monitoring is put in place as a means of controlling and managing the outcome.[564]

Existing regulations on prospecting and exploration for minerals in the Area all provide that:

> The [Legal and Technical] Commission shall develop and implement procedures for determining, on the basis of the best available scientific and technical information (…) whether proposed exploration activities in the Area would have serious harmful effects on vulnerable marine ecosystems and ensure that, if it is determined that certain proposed exploration activities would have serious harmful effects on vulnerable marine ecosystems, those activities are managed to prevent such effects or not authorized to proceed. [565]

Hydrothermal vents, seamounts and cold-water corals are examples of such vulnerable

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[563] International Seabed Authority (22 July 2013) 'ISBA/19/C/17 – Decision of the Council of the International Seabed Authority relating to amendments to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and related matters', Regulation 18(b). Available https://www.isa.org.jm/documents/isba19c17; accessed 17 Feb 2022. However, Jaeckel questions the meaningfulness of the EIA processes provided for as part of an application for an exploration contract and prior to specific exploration activities. The issues raised include that for each EIA process the Mining Code has limited the activities to which the requirement of EIA applies to those with the potential to cause serious environmental harm. AL Jaeckel, The international seabed authority and the precautionary principle: balancing deep seabed mineral mining and marine environmental protection (Brill Nijhoff 2017)

[564] ISBA/19/C/17 Regulations 21(4)(b), 31 and 32, ibid On ISA's mandate to protect the marine environment and adopt a comprehensive environmental strategy, see more generally A Jaeckel (2015) An Environmental Management Strategy for the International Seabed Authority: The Legal Basis, The International Journal of Marine and Coastal Law 30: 93-119

[565] Regulation 31(4) Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and related matters, ISBA/19/C/17 (22 July 2013); Regulation 33(4) of the Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area; and Regulation 33(4) of the Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area. Available https://www.isa.org.jm/documents/isba19c17; accessed 17 Feb 2022

ecosystems provided in the regulations on polymetallic sulphides and the regulations on cobalt-rich ferromanganese crusts.[566]

In 2012, the ISA approved the first regional-scale environmental management plan for the deep seabed of the Clarion-Clipperton Zone (CCZ), which includes the designation of Areas of Particular Environmental Interest (APEIs), as proposed by the ISA Legal and Technical Commission (LTC).[567] The ISA Council's decision was that the environmental management plan would be implemented over a three-year period and in a flexible manner so that it may be improved as more scientific, technical and environmental baselines and resource assessment data became available. However, the scientific criteria used to identify APEIs in the CCZ do not appear to be formalized or be the subject of new discussions on the CCZ.

Scientific publications show that polymetallic nodule fields in the CCZ are hotspots of abundance and diversity for a highly vulnerable abyssal fauna.[568] However, the question has also been raised that if high abundance in polymetallic nodules means higher biodiversity, the location of the APEIs in areas of lesser abundance appears questionable and diminishes the extent to which the designated APEIs will be able to prevent 'serious harmful effects on vulnerable marine ecosystems'.[569]

One of the recommendations made by the MIDAS Project is that 'recommendations from the ISA LTC should be explicit in how contractors should treat VMEs, EBSAs and other areas of

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[566] Nevertheless, the 2013 Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area do not mention threats to vulnerable, fragile or sensitive ecosystems or the habitat of threatened or endangered species, ISBA/19/LTC/8, 1 March 2013. Available https://www.isa.org.jm/documents/isba19ltc8; accessed 17 Feb 2022

[567] ISBA/18/C/22 – Decision of the Council relating to an environmental management plan for the Clarion-Clipperton Zone, 26 July 2012. Available https://www.isa.org.jm/documents/isba18c22; accessed 17 Feb 2022. See also M Lodge (2014) Seabed Mining: International Seabed Authority Environmental Management Plan for the Clarion-Clipperton Zone – A Partnership Approach, Marine Policy 49: 66-72. On the development of the Environmental Management Plan, see also Jaeckel (2017), supra note 564

[568] CL Van Dover (2018) Scientific Rationale and International Obligations for Protection of Active Hydrothermal Vent Ecosystems from Deep-sea Mining, Marine Policy 90: 20-28. Environmental Management of Deep-Sea Chemosynthetic Ecosystems: Justification of and Considerations for a Spatially-Based Approach, Technical Study No.9, ISA, 2015. Available https://www.isa.org.jm/documents/environmental-management-deep-sea-chemosynthetic-ecosystems-justification-and; accessed 17 Feb 2022

[569] Jaeckel (2017), supra note 564

importance to other stakeholders'.[570] Concerns have also been raised in the context of the granting of exploration contracts[571] for polymetallic sulphide deposits around hydrothermal vents (such as along the mid-Atlantic Ridge) that are known to host extremely vulnerable chemosynthetic ecosystems[572] and for ferromanganese crusts on seamounts.[573] Scientists focusing on the Mid-Atlantic ridge developed a proposal for APEIs in the North-Atlantic Ridge and the ISA published a Technical Study on the development of a framework for regional environmental management plans for polymetallic sulphide deposits on mid-ocean ridges in 2018.[574]

However, the focus of the ISA has since been on the development of a regulatory framework for the exploitation of minerals as the first 15-year exploration contracts were coming to an end and prompting efforts to shift to the exploitation phase to start commercial-scale exploitation.[575] Furthermore, several elements provide grounds for some cautious optimism that further developments are forthcoming for the protection of sensitive marine areas from deep seabed mining.

First, the discussion papers and workshop reports on the environmental aspects of the new regulations, available on the ISA website, expressly mention the importance of protecting

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[570] Implication of MIDAS Results for Policy Makers. Recommendation for Future Regulations, Managing Impacts of Deep Sea Resource Exploitation, December 2016 [38]. Available http://www.eu-midas.net/sites/default/files/downloads/MIDAS_recommendations_for_policy_lowres.pdf; accessed 17 Feb 2022. On the importance of the MIDAS Project to the work of the ISA, see M Lodge et al (2014) Seabed Mining: International Seabed Authority Environmental Management plan for the Clarion-Clipperton Zone. A partnership approach, Marine Policy 49: 66-72 [70]

[571] Status of exploration contracts granted by the ISA available at https://www.isa.org.jm/contractors/exploration-areas; accessed 17 Feb 2022

[572] CL Van Dover (2018), supra note 569

[573] Fauna of cobalt-rich ferromanganese crust seamounts, ISA Technical Study No.8, 2-11. Available https://www.isa.org.jm/documents/fauna-cobalt-rich-ferromanganese-crust-seamounts; accessed 17 Feb 2022

[574] See the work of the SEMPIA, 'Workshops: Towards the development of a Strategic Environment Plan for deep seabed mineral exploration and exploitation in the Mid-Atlantic Ridge, Horta, Portugal, 1-3 June 2015. Available https://webgate.ec.europa.eu/maritimeforum/en/node/3718; accessed 17 Feb 2022. See also Developing a Framework for Regional Environmental Management Plans for Polymetallic Sulphide Deposits on Mid-Ocean Ridges, Technical Study No22, ISA, 2018. Available https://isa.org.jm/files/files/documents/ts22.pdf ;accessed 17 Feb 2022

[575] Exploration contracts coming to an end have been extended by 5 years. Status of development, activities and documents available at https://www.isa.org.jm/news/isa-council-debate-exploration-contract-extension-hears-status-report; accessed 17 Feb 2022

vulnerable marine ecosystems and habitats, although the definition and process are not articulated yet.[576] Second, the acknowledgement by the ISA LTC in the Environmental Management Plan for the CCZ that, in the Area, states have a shared obligation to protect and preserve the marine environment which includes taking measures 'to protect and preserve rare or fragile ecosystems, as well as the habitats of depleted, threatened or endangered species or other forms of marine life'.

The LTC also discusses the EBSA and VME criteria and proposes that although some EBSA criteria were not incorporated in the scientific design of APEIs, they have to be taken into account in the future as more information becomes available.[577] Third, the current push from the international community for the protection of vulnerable marine ecosystems against serious adverse effects is echoed strongly by UNGA
Resolutions on Oceans and the Law of the Sea; its 2013 resolution also invites the ISA 'to consider developing and approving environmental management plans in other international seabed area zones, in particular where there are currently exploration contracts'.[578] Fourth, the work is still on going in the context of the development of Regional Environmental

[576] The ISA 2017 Discussion paper on the development and drafting of Regulations on Exploitation for Mineral Resources in the Area (Environmental Matters) includes several express references to the importance of vulnerable ecosystems and habitats including as an element of the EIA and environmental management process and monitoring that the Contractor is responsible for (Regulations 45 and 54). Criteria for the identification of vulnerable marine ecosystems and habitats and to determine whether proposed exploitation activities have a serious harmful effect on them have to be developed, taking into account characteristics used in identifying vulnerable marine ecosystems defined in connection with other regimes [99-100]. Available https://www.isa.org.jm/files/documents/EN/Regs/DraftExpl/DP-EnvRegsDraft25117.pdf; accessed 17 Feb 2022. The report of the workshop to review and discuss this ISA Discussion Paper acknowledges the provisions and work to be done with respect to vulnerable marine ecosystems and makes additional proposals. Towards an ISA Environmental Management Strategy for the Area, ISA Technical Study No.17, 2017. Available https://www.isa.org.jm/document/towards-isa-environmental-management-strategy-area; accessed 17 Feb 2022. The Scientific methodologies proposed in MR Clark's Discussion paper on 'Project-specific Environmental Impact Assessments' also include sensitive habitats (including biogenic habitats) among the elements to be covered during the survey programme. Available https://dredging.org/media/ceda/org/documents/projects/deep_sea_mining/05_isa_workshop_on_environmental_management_strategy_2017.pdf; accessed 17 Feb 2022

[577] ISBA/17/LTC/7, 13 July 2011. Available https://www.isa.org.jm/documents/isba17ltc7; accessed 17 Feb 2022. Nevertheless, the LTC approved some controversial sulphide exploration operations at Lost City, an area identified as an EBSA and proposed by the World Heritage Commission for listing as a World Heritage Site on the High Sea. See the open letter by BN Orcutt supported by another 39 deep-sea scientists from around the world on 8 Nov 2017. Available http://dosi-project.org/wp-content/uploads/2015/08/OrcuttlettertoISA_Nov17.pdf; accessed 17 Feb 2022

[578] UNGA A/RES/68/70, 27 February 2014. Available https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_68_70.pdf; accessed 17 Feb 2022

Management Plans.[579]

Finally, it seems that the identification and protection of sensitive marine areas and of APEIs must be distinguished from that of preservation reference zones which are located within the seabed contract areas. These zones must be designated and excluded from mining by the exploitation contractor and provided with their own environmental management plan.[580]

2.3.2 Scientific and technical criteria

One of the six guiding principles of the environmental plan for the CCZ is the 'conservation and sustainable use of biodiversity'; on the basis that 'all states have a duty to conserve and sustainably use marine biodiversity'.[581]

The design of the network of nine APEIs in the CCZ was guided by best environmental practices and the use of spatial management tools. The following scientific indicators were considered:

- spatial variation and representativity, to ensure the protection of areas thought to be representative of the full range of habitats and based on nine bio-geographic areas[582]
- a size appropriate to cover large areas of self-sustaining populations and a broad range of habitat variability, biodiversity and ecosystem structure and function within the management area (200 km by 200 km surrounded by a buffer of 100 km),
- scientific design that relies on generally accepted and widely applied principles for the design of MPA networks and includes the protection of 30% to 50% of the total management area. This last indicator uses geological, oceanographic and biological

[579] See the planning of the ISA in 2021 and 2022 on this topic. Available https://isa.org.jm/minerals/environmental-management-plan-clarion-clipperton-zone; Accessed 17 Feb 2022

[580] That preservation reference zones are located within the contract area is clearly stated in the CCZ Management Plan. ISBA/17/LTC/7 para. 41(c). However, it was not specified in the Mining Code. ISBA/19/LTC/8 Regulations 26(d) and Annex I para. 53. On the possibility to have contractor designate preservation reference zone outside their contract area, see M Lodge (2011) Some legal and policy considerations relating to the establishment of a representative network of protected areas in the Clarion-Clipperton Zone, International Journal of Marine and Coastal Law 26: 463-480 [466-467]

[581] The other five are (a) common heritage of mankind, (b) precautionary approach, (c) protection and preservation of the marine environment, (d) prior EIA and (f) transparency.

[582] Lodge et al (2014) [71], supra note 568

proxy data[583] based on previous ISA workshops and reports, as well as scientific peer-reviewed literature and experience,

- flexibility, so that the location and size of the areas can be modified based on improved information.[584]

This approach appears to be holistic and partly qualitative. However, the extent to which species abundance and distribution were taken into account is not specified. The CCZ management plan itself mentions that areas of special significance valued according to the following criteria were not incorporated in the scientific design but may be included in the future, as more information becomes available:

- their uniqueness;[585]
- biological diversity;
- biological productivity;
- areas of special importance to the life histories of non-fish species.

Furthermore, the extent to which potential or actual vulnerability to on-going human activities, natural events and their impact are taken into account in the identification of APEIs is also unclear.

2.3.3 Reporting, monitoring and restricted activities

The reporting and monitoring obligations of contractors described in the mining code relate to the contract site being mined and include the impact and preservation reference zones. However, no such obligation is place for the APEIs at this point.[586] The CCZ Environmental Management Plan prepared by the LTC states that it should keep the areas of APEIs under review. Although the ISA Council decided to apply the plan on a provisional basis and requested the LTC to make recommendations to review the size, location and

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[583] On the use of geological, oceanographic and biological proxy data in the identification of the APEIs, see D Johnson and MA Ferreira (2015) ISA Areas of Particular Environmental Interest in the Clarion-Clipperton Fracture Zone, International Journal of Marine and Coastal Law 30: 559-574 [561-562]

[584] ISBA/17/LTC/7

[585] This is at odds with the vision statement of the CCZ management plan to preserve 'representative and unique marine habitats and species', ibid

[586] Johnson and Ferreira (2015) [562], supra note 584

number of the APEIs, no clear review timeframe is defined.

Furthermore, the decision to ban applications for exploration work in APEIs for three years or until further review by the LTC suggested that the issue was to be revisited.

2.3.4 Application in the SCS

Of the SCS littoral states, all the states that became a party to UNCLOS also became a party to the 1994 Agreement for the Implementation of the provisions of Part XI of the Convention of 10 December 1982 (the 1994 Implementation Agreement), a prerequisite to exploration and exploitation for minerals in the Area.[587] Cambodia is the only non-party.

In the context of the SCS, the question is rather whether there is an area of the seabed which is located beyond national jurisdiction and therefore qualifies as the Area. There are two sources of uncertainty.

First, the southern part of the basin located beyond 200NM of the littoral states has been declared by Brunei, Malaysia and Vietnam as being part of their continental shelf.[588] Malaysia and Vietnam made, both jointly and independently, submissions to the Commission on the Limits of the Continental Shelf (CLCS) in 2009 and 2019 to delineate the outer limits of their continental shelf beyond 200NM.[589] Brunei also filed a preliminary submission on 12 May

[587] Part XI of UNCLOS is devoted to the Area (seabed and subsoil beyond national jurisdiction) and particularly the exploration for and exploitation of mineral resources in the Area. 1994 Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, 28 July 1994 (entered into force on 28 July 1996) 1836 UNTS 3. Status of adoption, supra note 490

[588] UNCLOS Article 76 on the definition of the continental shelf provides for circumstances in which the outer edge of the legal continental margin of coastal states can extend beyond 200NM. Information on the limits of the continental shelf beyond 200NM must be submitted to the CLCS for recommendations, prior to the decision made by the coastal state on the basis of this recommendation becoming final and binding.

[589] The first submission was the joint submission of Malaysia and Vietnam of 6 May 2009. Available https://www.un.org/Depts/los/clcs_new/submissions_files/mysvnm33_09/mys_vnm2009excutivesummary.pdf; accessed 21 Feb 2022. Vietnam made a partial submission on 7 May 2009. Available https://www.un.org/Depts/los/clcs_new/submissions_files/vnm37_09/vnm2009n_executivesummary.pdf; accessed 21 Feb 2022. Status of the communication to the CLCS available at https://www.un.org/depts/los/clcs_new/commission_submissions.htm; accessed 21 Feb 2022

2009.[590] These submissions prompted notes verbale from China and the Philippines and replies from the submitters.[591] No recommendation has yet been made by the CLCS.[592]

Second, maritime claims in the SCS all cover at least part of the seabed area located beyond 200NM from the mainland of the littoral states. This creates doubts as to whether any seabed would be part of the Area in the SCS. However, the SCS Arbitral Award of 12 July 2016 determined that none of the geographic features in the SCS is capable of generating a continental shelf of its own. This suggests that some seabed beyond national jurisdiction may remain. This said, mineral resources in the SCS exciting interest and attention appear to be primarily oil, gas and methane hydrates, for which the ISA has not yet adopted any regulations. Based on this, the immediate direct relevance of APEIs in the SCS may appear at most limited. However, arguably, they are indirectly relevant as they contribute to the establishment of a global sensitive marine areas regime which can have implications for the SCS and other large regional seas.

2.4 Dump-site selection under the London Convention and Protocol

2.4.1 Legal background

A fourth forum for the regulation of activities at sea where provisions were adopted to protect sensitive areas is the COP to the 1972 London Convention and its 1996 Protocol. Article IV of the

[590] Available http://www.un.org/depts/los/clcs_new/submissions_files/preliminary/brn2009preliminaryinformation.pdf; accessed 20 Mar 2022

[591] For a comprehensive review of the exchange between littoral States on this topic, see HT Nguyen, Extended Continental Shelf: A Renewed SCS Competition, Maritime Issues, 17 April 2020. Available http://www.maritimeissues.com/law/extended-continental-shelf-a-renewed-south-china-sea-competition.html ; accessed 21 Feb 2022

[592] On 1 October 2009, the CLCS decided to defer further consideration of the submission and the notes verbales [from China and the Philippines] until the submission is next in line for consideration as queued in the order in which it was received. CLCS/64, item 21. R Beckman argues that the CLCS is likely to continue defering consideration of the submissions, See R Beckman, SCS Dispute Arise Again, 6 January 2020, Straits Times, Singapore. Available https://cil.nus.edu.sg/publication/south-china-sea-disputes-arise-again/; accessed 21 Feb 2022. However the CLCS could also decide to consider the submissions on the basis of the 12 July 2016 SCS Arbitral Award. See HT Nguyen, Malaysia's New Game in the SCS – What to make of Kuala Lumpur's new claim to an extended continental shelf in the SCS, The Diplomat, 21 December 2019. Available https://thediplomat.com/2019/12/malaysias-new-game-in-the-south-china-sea/; accessed 21 Feb 2022

1972 London Convention requires that a permit be issued prior to the disposal at sea of any authorised waste following 'careful consideration of all the factors set forth in Annex III, including prior studies of the characteristics of the dumping site'. These factors include taking into account other areas, such as 'amenity areas, spawning, nursery and fishing areas and exploitable resources', as well as the method of deposit, dispersal, water, bottom characteristics and possible effects on marine life and other uses of the sea. The 1996 London Protocol also requires a similar procedure for the dump-site selection.[593]

These provisions for dumping permits in the 1972 London Convention were incorporated by reference in UNCLOS Article 210 on pollution by dumping. This article provides for prior approval by the coastal state and the obligation for states to adopt laws, regulations and measures which are 'no less effective than the global rules and standards'. There is a strong case to argue that the 1972 London Convention, its 1996 Protocol and the guidelines adopted for their implementation are the global rules and standards referred to in this provision. This is based on (i) the definition of 'dumping' in UNCLOS reiterating exactly the definition of 'dumping' in the 1972 London Convention,[594] and (ii) this Convention and/or its 1996 Protocol being widely adopted (100 adoptions together, see below). States' laws, regulations and measures adopted to protect the marine environment against the disposal of waste at sea must therefore be as effective as the minimum set out in the London Convention and its Protocol, taking into account the Generic Waste Assessment Guidelines adopted by the COPs to the 1972 London Convention and the 1996 London Protocol.[595] Furthermore, this status as 'global rules and standards' under UNCLOS Article 210 applies irrespective of whether a state

[593] 1972 London Convention, Article 4 and Annex III (Article 4(2)) and 1996 London Protocol, Annex II

[594] See Y Lyons (2014) The New Offshore Oil and Gas Installation Abandonment Wave and the International Rules on Removal and Dumping, International Journal of Marine and Coastal Law 29: 480-520 [486-487 and 505]

[595] 1997 Guidelines for the Assessment of Wastes or Other Matter, Articles 6(4) and 7(4), superseded by the 2008 Generic Guidelines for the Assessment of Wastes or Other Matters, LC30/16 Annex 3 and subsequently revised in 2014. Available https://www.imo.org/en/OurWork/Environment/Pages/wag-default.aspx; accessed 21 Feb 2022

is a party to the London Convention or its Protocol.[596]

2.4.2 Adoption

As of 11 November 2021, the 1972 London Convention has 87 parties, and the 1996 London Protocol has 53 parties. One hundred states have adopted either the London Convention or the London Protocol (some have adopted both and were not counted twice).[597] In Southeast Asia, China and the Philippines are the only states to have adopted the London Convention or its Protocol (Table 2.11).

However, as mentioned in the previous section, this does not *ipso facto* mean that the criteria adopted with respect to sensitive marine areas would not inform the international rules and standards applicable to dumping of waste at sea, even for states that are not a party to these agreements. The legal status of these criteria is further discussed in Chapter 6 of this study.

Table 2.11: Status of adoption of the 1972 London Convention and its 1996 Protocol by littoral states of the SCS

Littoral states of the SCS	LC - Adoption	LP - Adoption
Brunei Darussalam	-	-
Cambodia	-	-
China	3 Sept 1977	29 Oct 2006
Indonesia	-	-
Malaysia	-	-
Philippines	30 Aug 1975	8 Jun 2012
Singapore	-	-
Thailand	-	-
Vietnam	-	-

[596] On the mechanisms of incorporation by reference in UNCLOS, see A Boyle (1985) Marine Pollution under the Law of the Sea Convention, American Journal of International Law 79: 347-372 [356] and P Birnie, A Boyle and C Redgwell, International Law and the Environment, Third Edition, OUP New York [389]. Specifically on the London Convention and Protocol on this topic, see Lyons (2014) [500-512] supra note 595. See also GH Hong and YJ Lee (2015) Transitional Measures to Combine Two Global Ocean Dumping Treaties into a Single Treaty, Marine Policy 55:47-56 [50]

[597] The 1996 London Protocol supersedes the 1972 London Convention for States that become a party to the 1996 London Protocol whilst they were a party to the 1972 London Convention; it was intended to eventually replace the 1972 London Convention. However, not all States that initially adopted the 1972 London Convention have ratified the 1996 London Protocol. Furthermore, since the 1996 London Protocol entered into force, new parties have joined the 1972 London Convention instead of the 1996 London Protocol. The COPs of both conventions are held jointly and are administered by the Office of the London Convention and its Protocol, hosted by the IMO Secretariat. The status of adoption is based on the report of the last meeting of the COPs which took place on 25-29 October 2021, LC43/17 [5]. See also Hong and Lee (2015), ibid

2.4.3 Scientific and technical criteria

The Generic Waste Assessment Guidelines list 'important amenities, biological features and uses of the sea to be considered in determining the specific location of the dump-site area' including:

- shoreline and bathing beaches;
- areas of beauty or significant cultural or historical importance;
- areas of special scientific or biological importance, such as sanctuaries;
- fishing areas;
- spawning, nursery and recruitment areas;
- migration routes;
- seasonal and critical habitats;
- shipping lanes;
- military exclusion zones;
- engineering uses of the seafloor, including mining, undersea cables, desalination or energy conversion sites.[598]

As can be seen from this list, the site-selection process is not focussed solely on ecologically sensitive areas which only concern four criteria out of 10 (criteria 3, 5, 6 and 7). Other criteria concentrate on other values (economic, social, cultural, historical, and scientific) and uses of the sea such as fishing, shipping, military, and mining.

2.4.4 Assessment of potential effects, reporting and monitoring processes

To decide whether to permit waste disposal at sea, states must study the potential cumulative effects from several dumping events, including their effects on sensitive areas and consider seasonal variations.[599] The Guidelines also set out the importance of assessing potential effects from dumping, including potential impacts on 'sensitive areas (e.g. spawning, nursery or feedings areas), habitat (e.g. biological, chemical and physical modification), migratory patterns and marketability of resources'.

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[598] Generic Waste Assessment Guidelines, section 19

[599] 1972 London Convention Annex III B(8) and (9) and C, 1996 Protocol Annex 2 sections 12, 13 and 14

States have an obligation to report on the permits granted and the criteria, measures and requirements adopted to comply with Annex III, which includes reference to sensitive areas. If sensitive areas are avoided, the reports would consequently have no reason to refer to such areas.[600] Reporting obligations also concern the high seas.[601] The 1996 Protocol includes more specific reporting and monitoring requirements, including compliance monitoring,[602] with respect to dumping sites.[603] States are also expected to review their permits at regular intervals, taking into account the results of monitoring.

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The criteria for the identification of sensitive marine areas examined in this chapter were all adopted in the context of limiting effects from activities at sea. Their examination showed that they are very varied. Although ecological criteria are dominant considerations, some instruments also seek to limit effects on areas on the basis of non-ecological values of these areas. These non-ecological criteria include social, cultural, economic, scientific and educational criteria.

Following the response in Chapters 1 and 2 to the first sub-research question focused on identifying the legal criteria that characterise sensitive marine areas under international law treaties and subsidiary documents applicable in the SCS, Chapter 3 analyses and compares these suites and criteria, proposes a Reference Criteria Set and tests it by considering practices in other parts of the world.

[600] 1972 London Convention Article VI(4)

[601] 1972 London Convention Article VII(3)

[602] 1996 London Protocol Annex 2 section 16

[603] 1996 London Protocol Articles 17(4) and 18

Chapter 3: Comparisons of the suites of scientific criteria and of their application in the SCS

Chapter 3 analyses the two broad categories of ecological and non-ecological criteria, across all the family of instruments. This analysis responds to the second research sub-question focused on determining whether the different sets of criteria adopted under different legal regimes are competing by comparing them.

The different sets of criteria outlined in Chapters 1 and 2 use some recurring terminology. However, they also use different terminology, categories and nomenclature developed to suit the objective of the family of instruments in whose context they were devised and adopted. To overcome these differences in terminology and categorisation and compare these criteria, a frame of reference was developed. A reference set of criteria (the 'Reference Criteria Set') was therefore designed by the author on the basis of a framework method for comparison purposes. (see Section 3 of the Introduction).

This Reference Criteria Set includes all the ecological and non-ecological criteria discussed in Chapters 1 and 2 and avoids repetitions. The comparison of the sets of criteria is divided into two groups, each of which is examined separately:

(1) the ecological criteria, which seek to identify an area for its ecological or biological attributes, and

(2) all the other criteria, including economic, social, cultural, scientific and educational criteria. This very diverse category of 'non-ecological' criteria highlights other values of different marine (including coastal) areas on the basis of which international bodies considered that these areas should be granted a particular 'sensitivity' status and greater care.[604]

[604] Gilman et al make the same distinction between ecological criteria and other criteria grouped under the category name of 'socio-economic and governance criteria', E Gilman et al (2011) Designing criteria suites to identify discrete and networked sites of high value across manifestations of biodiversity, Biodiversity Conservation 20: 3363–3383. Although this analysis focuses on identification of areas prior to determining adequate management measures, some instruments include management consideration as a pre-condition for identification; these are included in 'practical considerations' rather than 'governance'.

The comparison is summarised in Tables 3.1, 3.2 and 3.3 below. (Section 3.3)

In addition to the ecological and non-ecological criteria themselves, the sets of criteria are sometimes complemented by other considerations that may be examined when identifying areas and their boundaries. Such considerations can relate to the application of the ecological criteria, whereas others are broader. Considerations that relate primarily to the ecological criteria concern:

- the geographic scale considered, including the relevant biogeographic classification;[605]
- the size of the area, for example, to ensure that it is large enough to encompass the ecological functions on the basis of which it has been identified;[606]
- the urgency to identify this area as sensitive on the basis of, for example, the level of environmental and/or anthropogenic threats it is facing;[607]
- the restorability of the area or its ability to recover, should it be already affected by adverse effects.[608] This consideration may, to some extent, be seen as being included in criterion 10 of the Reference Criteria Set on refugia and resilience.

This chapter subsequently compares and critiques the results of this overall comparative analysis of criteria with the practice and rules adopted in four regional seas with more developed and detailed legal and institutional mechanisms for the protection of the marine environment, including binding regulations. These are:

(1) the Antarctic Treaty System (ATS) and the Convention for Conservation of Antarctic Living Resources (CCALR),

(2) the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR),

(3) Specially Protected Areas (SPA) and Specially Protected Areas of Mediterranean Interest (SPAMI);

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[605] CBD Ottawa Workshop Report, Annex V supra note 161. Also, an essential consideration in the design of APEIs for the Clarion-Clipperton Zone, supra section 2.3.2

[606] For example, in the application of OUV criterion 9 on ecological and biological processes. World Heritage Convention Operational Guidelines [para. 94], supra note 257. Also, an essential component of the design of APEIs for the Clarion-Clipperton Zone, supra Part 1 Section 2.3.2 and criterion 5.2 of the ASEAN MPAs criteria's fifth subset of pragmatic criteria

[607] CMS COPs have highlighted the importance of assessing risks to identify sites of critical importance. See supra section 1.4.3. Another example is criterion 5.1 of ASEAN MPAs criteria's fifth subset of pragmatic criteria. The assessment of threats from shipping in the designation of Special Areas under MARPOL and PSSAs is another example

[608] Criterion 5.7 of ASEAN MPAs criteria's fifth subset of pragmatic criteria

and,

(4) the 1990 Caribbean's Specially Protected Areas and Wildlife (SPAW) protocol.

This last section responds to the third research sub-question, which is focused on testing the Reference Criteria Set with the criteria and mechanisms adopted to identify and protect sensitive marine areas in other regional seas of the world.

3.1 Ecological criteria

3.1.1 The ecological Reference Criteria Set and methodology

In order to serve as the basis for comparison of all sets of criteria, the Reference Criteria Set was created as the frame of reference needed to encompass all the criteria included in the different criteria set. The EBSA criteria were chosen as the first building block for comparing ecological criteria for the identification of sensitive marine areas on the basis of the following considerations:

- These criteria are applied by the COP of the CBD to all maritime zones and are therefore the most geographically comprehensive,
- They also apply to all marine systems (coastal, marine, deep seabed, etc.), rather than only to subsets of the marine environment, such as wetlands or critical habitats for migratory species.

However, the scope of the EBSA criteria is limited to the identification and conservation of biodiversity, rather than the protection of the marine environment in general and of critical habitats for commercially valuable fisheries. This is why other sets of criteria include elements absent from the EBSA criteria. The description of the seven EBSA criteria was therefore completed to include corresponding criteria developed under other instruments (or emphasised more in other instruments, such as distinctiveness, including genetic distinctiveness as a sub-criterion as well as uniqueness and rarity). The resulting list of criteria has also been extended with three additional criteria which are not included in the EBSA criteria but are included in other families of instruments. These are representativity, connectivity and refugia.

The resulting list of all ecological criteria in the Reference Criteria Set is therefore as follows:

- C1 - Uniqueness or rarity
- C2 - Special importance for life history of species
- C3 - Threatened or endangered or declining species or habitats
- C4 - Vulnerability, fragility, sensitivity, slow recovery
- C5 - Biological productivity
- C6 - Biological diversity
- C7 - Naturalness
- C8 - Representativity
- C9 - Connectivity
- C10 - Refugia, site resistance, resilience

The sufficient inclusiveness of this ecological Reference Criteria Set and its suitability were verified and demonstrated by Tables F4 to F12 in Appendix F to this study. They show the extent to which each criterion of the criteria sets reviewed in Chapters 1 and 2 is included in the Reference Criteria Set with a result of 91% inclusion. Examination of the criteria which are not included shows that their absence from the Reference Criteria Set does not contradict the selection of criteria for the Reference Criteria Set. Instead, these other criteria, which are included in three sets of criteria, highlight other aspects of sensitive marine areas which are specific to the instrument concerned.

In the OUV set of criteria,[609] the mission criterion focuses on major stages of earth history, including geomorphic and physiographic features. These may overlap with criterion 2 of the Reference Criteria Set on special importance for life history of species, but they do not necessarily always do so. In the MARPOL set of criteria,[610] the two missing criteria focus on ocean condition (including oceanographic features) and vessel characteristics, respectively, which are specific to the purpose of identification of Special Areas and the resulting restrictive rules that apply to shipping traffic once the measure is adopted. Finally, the two missing criteria from the APEI[611] are linked to the early stage of development of APEIs and show that, similar to the criteria for the identification of MARPOL Special Areas, the APEI criteria are

[609] Supra Chapter 1 Section 1.3.3, Table 1.10

[610] Supra Chapter 2 Section 2.1.1 Table 2.3

[611] Supra Chapter 2 Section 2.3

envisaged in the context of restriction of seabed mining activities.

To compare sets of criteria, each criterion of the Reference Criteria Set is examined across all sets of legally adopted criteria in order to identify commonalities and differences. This analysis is summarised in Table 3.1 (for instruments discussed in Chapter 1) and Table 3.2 (for instruments discussed in Chapter 2). Two appendices to this study document the detailed analysis carried out for each criterion:

- Appendix D includes 10 tables (D1 to D10), one for each of the criteria of the Reference Criteria Set, to identify the equivalent or similar criterion in the 15 sets of criteria, if any. This analysis formed the basis for the summary Tables 3.1 and 3.2;
- Appendix F provides the detailed working of the quantitative analysis of the extent to which each criterion is included in the 15 different sets of criteria examined. Tables F2 and F3 provide the computational details.

Figure 3.1 shows the frequency of use of the ten ecological criteria in the 15 instruments reviewed. An additional set of criteria was added as they are abundantly referred to by international bodies and in the literature: the criteria developed by the IUCN to identify Key Biodiversity Areas set out in Appendix E.[612] The comparative analysis below is informed by the scientific literature on this topic, including alternative sets of criteria proposed by scientists.

Although APEIs adopted for the CCZ are included in the comparative analysis, that they do not explicitly refer to several usual criteria should be considered carefully. As discussed in section 2.3, these APEIs were designed as a first step or pilot and were not based on criteria such as those adopted for other sensitive areas. It is hoped that appropriate criteria will be adopted and used in the development of regional management plans for deep seabed mining. [613]

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[612] IUCN 2016 Global Standard for the Identification of Biodiversity Areas. Available https://portals.iucn.org/library/node/46259; accessed 21 Feb 2022. See for example the express reference in guidance by UNEP and the WCMC. Available https://www.biodiversitya-z.org/content/key-biodiversity-areas-kba.pdf; accessed 21 Feb 2022

[613] See for example the discussions on the development of a regional plan in the context of deep seabed mining operations on the mid-Atlantic Ridge in Chapter 2 Section 2.3.1

3.1.2 C1- Uniqueness or rarity

This criterion of the EBSA criteria groups uniqueness and rarity under the same criterion with the following definition: 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.

It can be applied to species, populations, communities, habitats, ecosystems and geomorphological or oceanographic features. It can also be applied at a variety of scales, including the global ocean basin, regional and local scale.[614] This EBSA criterion is therefore wide enough to include criteria from all other sets of criteria which refer to characteristics of uniqueness and rarity, although they may use a different language, such as: 'Superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance'; site that 'may possess special features that could not be seen in any other site'; 'the only one of its kind'. (Appendix D, Table D.1)

In the context of OUVs, criterion 7 (that an area presents characteristics of 'superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance'), is considered to characterise a form of uniqueness or rarity.[615] The uniqueness and rarity criterion of the Ramsar criteria also includes representativeness. An area would qualify as a wetland of international importance if it were either of a representative, rare or unique wetland type.[616] This criterion is considered independently below.

Uniqueness and rarity can also be considered to overlap with habitats of rare, threatened or endangered species as found in the criteria for the identification of PSSAs and VMEs. EBSA

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[614] Ottawa Report, supra note 161. See also Guidance on the Use of Biogeographic Classification Systems and Identification of Marine Areas Beyond National Jurisdiction in Need of Protection, UNEP/CBD/SBSTTA/14/INF/4*, 11 January 2010. Available https://www.cbd.int/doc/meetings/sbstta/sbstta-14/information/sbstta-14-inf-04-en.pdf; accessed 21 Feb 2022

[615] See Chapter 1 Section 1.3.3

[616] See Chapter 1 Section 1.2.3

criterion 1 refers to distinct habitats or ecosystems. It does not refer to species which would be rare or unique as a result of their genetic distinctiveness or other ecologically distinctive characteristics as per the IMMA criteria.[617] In the context of migratory species listed in CMS Appendices, CMS COP considered on several occasions that the

> identification and conservation of habitats of appropriate quality, extent, distribution and connectivity' (…) [as well as, of all] sites that perform a critical role (…) such as core areas, corridors, restoration areas and buffer zones' are critical for conservation of migratory species.[618]

Such sites could be considered as unique or rare when they are necessary for populations which are genetically and demographically isolated from other populations of the same species, for example. With respect to the EBSA set of criteria, distinct habitats or ecosystems are included in criterion 1. However, taxonomic distinctness and genetic distinctiveness may be considered to be included in the criterion on biological diversity.[619] This is consistent with the treatment of genetic distinctiveness in criteria for Key Biodiversity Areas (KBAs) which inform application of criterion 2 to geographically restricted species. The IMMA criteria include distinctiveness as a sub-criterion for areas which sustain populations with important genetic, behavioural or ecologically distinctive characteristics.[620] For clarity, it is proposed to include distinctiveness in criterion 1 of the Reference Criteria Set as 'unique, rare

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[617] Supra Table 1.16 and note 382 [19]

[618] CMS COP10, CMS COP11, CMS COP12 Resolution 12.7. Available http://cms.int/sites/default/files/document/cms_cop12_res.12.7_e.pdf; accessed 20.Mar 2022 See also Resolution 9.9 (Rev.COP12) where Parties, the Scientific Council and the CMS Secretariat are urged to identify priority 'species and habitats in the marine sphere requiring intervention by the CMS'. Available http://cms.int/sites/default/files/document/cms_cop12_res.9.9%28rev.cop12%29_e.pdf; accessed 20 Mar 2022

[619] EBSA Training Manual [19]. E Gilman et al (2011) suggest that the phylogenetic distinctiveness could be a separate criterion [3371], supra note 605

[620] IMMA criterion 4. For a discussion on evolutionary distinctiveness and whether it should be added to the criteria, see G Eken et al (2004) Key Biodiversity Areas as Site Conservation targets, American Institute of Biological Sciences 54(12): 1110-1118 [1111]

or distinctive'.[621]

3.1.3 C2 - Special importance for life history of species

This criterion can include any critical life-history stages of a species or population, such as: areas used as breeding grounds; spawning/nursery areas; juvenile habitats; critical habitats of migratory species, including feeding/wintering/resting/ breeding/moulting areas; and migratory routes. It is particularly relevant but not limited to critical habitats for migratory species.[622] Descriptions of this criterion can be found with more or less detail depending on the instrument. However, the general acceptance of the importance of this criterion is not in doubt. Similar language is used in all sets of criteria with reference to, for example, critical 'stage in life cycle' or life stage,[623] 'key life cycle activities'; and functional significance of a habitat,[624] such as breeding/nesting/spawning/ foraging grounds/areas and migratory routes. Aggregations such as seasonal aggregations could and should also qualify.[625]

Two points of note: (i) this criterion 'leaves open the question of how an area can be determined to be required for survival' and (ii) it is similar in kind to criterion 3 which relates to threatened and endangered species. This observation is based on the fact that criterion 3 includes areas required for life-history stages of threatened and endangered species.[626] Dunn et al (2014) state that EBSA criterion 3, which relates to sites that are important for

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[621] Also supported by EJ Gregr et al (2012) Reconciling Classifications of Ecologically and Biologically Significant Areas in the world's oceans, Marine Policy 36: 716-726; JC Roff and SMJ Evans (2002) Frameworks for marine conservation-Non-Hierarchical Approaches and Distinctive Habitats, Aquatic Conservation: Marine and Freshwater Ecosystems 12:635-648; and S Derous et al (2007) A Concept of Biological Valuation in the Marine Environment, Oceanologia 49(1): 99-128.

[622] See Ramsar Criterion 2 in Ramsar Guidelines and specific reference to critical sites for migratory species in Ramsar CMS Resolution on critical habitats. Similarly, OUV criterion 10 in the World Heritage Convention Operational Guidelines include specific reference to critical areas for migratory species such as seasonal breeding and nesting sites, and migratory routes.

[623] EAAFP criterion 2 and the analysis of P Dearden and KN Topelko (2005) Establishing criteria for the identification of ecologically and biologically significant areas on the high seas, Background Paper for the CBD Expert Workshop On Ecological Criteria And Biogeographic Classification Systems For Marine Areas In Need Of Protection Azores, Portugal, 2–4 October 2007, Fisheries and Oceans Canada, Ottawa, Ontario.Available https://www.dfo-mpo.gc.ca/csas-sccs/Publications/ESR-REE/2004/2004_006-eng.html; accessed 20 Mar 2022. See also https://www.cbd.int/doc/meetings/mar/ewsebm-01/information/ewsebm-01-cop-08-inf-39-en.pdf; accessed 20 mar 2020

[624] VME criterion 4

[625] KBA Standards [15]

[626] EBSA Ottawa Report and EBSA Training Manual, supra note 161 [42] and [8], respectively

threatened,endangered or declining species and/or habitats, was added to criterion 2.[627] This was based on the lower standard of evidence required with respect to criterion 3 (area used by endangered species) compared to the justification that an area would meet the life history criterion.[628]

Regardless of whether the life history criterion is presented as an independent criterion in criteria sets or is included in other criteria, there is no doubt of the importance of these areas that are required for the survival of species or populations and the fact that they qualify.[629] The Reference Criteria Set keeps this criterion separate, as it is also in the EBSA criteria, for clarity.

3.1.4 C3 - Importance for threatened, endangered or declining species, habitats and/or ecological communities

Threatened species and threatened ecosystems/communities are among the most frequently used criteria included in sets of criteria to identify sensitive areas, regardless of whether they were legally adopted or proposed by scientists.[630] The concern to identify areas necessary for the survival of threatened and endangered species can be found in all sets of criteria, either explicitly or implicitly.[631] However, Ramsar criteria group both this criterion and the following one on vulnerable species and habitats in Ramsar criterion 2, which focuses on 'vulnerable, endangered or critical endangered species or threatened ecological communities'. The criteria of rarity and site importance for endangered species can also be grouped or overlap.[632]

'Ecological communities', explicitly mentioned in the corresponding Ramsar criterion 2 and not

[627] And the initial set of six criteria following CBD Azores workshop in 2007

[628] Supra note 152

[629] The best evidence is provided by comparative analyses of all criteria suites. See, for instance, P Dearden and KN Topelko, supra note 624 and Gilman et al (2011), supra note 605 [3372]

[630] Gilman et al (2011), supra note 605 [3372]

[631] The IOSEA Marine Turtles criteria do not include an explicit reference to endangered, threatened or declining species and/or habitats, but they apply to some species listed on the appendices of CITES and CMS and are unequivocally recognised as being endangered or threatened

[632] For example, ASEAN MPA criterion 3.1 and PSSA criterion 1.1

explicitly mentioned in EBSA criterion 3, and other comparable criteria, can be considered to be implicitly included. This is based on the nature of ecological communities, a group or assemblage of organisms interacting in a unique habitat.[633] It is also consistent with EBSA criteria 1, 5 and 6, which include populations, communities and ecosystems and that the EBSA Training Manual includes ecological communities in the application of EBSA criterion 4. The PSSA criteria and CCZ APEIs also explicitly refer to communities, along with habitats and ecosystems. VME criteria also apply to communities.[634]

However, in the context of shared marine ecosystems and/or resources, for states to have a shared understanding and identification of species, habitats and ecosystems that may be threatened or endangered is a different matter, unless regional mechanisms have been established for this purpose.[635] Under international law, 'endangered' species and discrete populations of species[636] would be those that are threatened with extinction.[637] Measures then would depend on the nature of the threats to these species.

However, the unequivocal and unqualified obligation on states to adopt 'measures necessary to protect and preserve' (…) 'the habitat of depleted, threatened or endangered species and other forms of marine life', contained in UNCLOS Article 194(5), does not provide guidance on this question. This point is further discussed in Chapter 6 Section 6.2.2.

CITES focuses on the regulation of international trade in specimens of threatened species of flora and fauna and lists these species in appendices according to the degree of protection deemed necessary for their survival.[638] All trade in specimens of species included in Appendix I requires a permitting and control procedure on both imports and exports so that this trade will not be detrimental to the survival of that species. Appendix II includes species under a less imminent threat of extinction, i.e. species for which trade is limited, in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it

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[633] Ramsar Guidelines define an ecological community as a naturally occurring group of species inhabiting a common environment, interacting with each other especially through food relationships and relatively independent of other groups

[634] PSSA criteria 1.4, 1.5 and 1.10; ISBA/17/LTC/7 [para. 25]; and VME criterion 5 especially. See also FAO (2016) Vulnerable Marine Ecosystems: Processes and Practices in the High Seas, Technical Paper 595, Rome, Italy [43]. Available http://www.fao.org/3/a-i5952e.pdf; accessed 21 Feb 2022

[635] Refer to Chapter 3 Section 3.4 below for examples of these in regional seas

[636] In the context of CITES, species is defined as any species, subspecies, or geographically separate population thereof

[637] P Birnie, A Boyle and C Redgwell, International law and the environment, Third edition, Oxford University Press, 2009 [587]

[638] On the application of CITES, supra Part 1 Chapter 1 Section 1.4.2.2 and note 340. For an application of this concept to a threatened species in the SCS, see also Lyons et al (2018), Managing giant clams in the SCS, The International Journal of Marine and Coastal Law 33; 467-494 [484-485]

occurs and well above the level at which that species might become eligible for inclusion in Appendix I.[639] Species included in Appendix III are under less stringent scientific verification; however, the trade must have been conducted in accordance with local regulations, including their protection. CITES Appendices are binding and therefore critical under international law to demonstrate the endangered status of a species.[640] The only other global treaty with a similar list is the CMS.[641] However, it is not widely adopted in Southeast Asia.[642] Other families of instruments concerned with endangered species and their habitat do not refer to either CITES or CMS.

The World Heritage Convention focuses on habitat of threatened species of animals and plants of OUV from the point of view of science and conservation.[643] To apply the Ramsar Criteria, the Ramsar Guidelines refer to the classification adopted by the IUCN Species Survival Commission and used by the IUCN Red List: 'critically endangered', 'endangered' and 'vulnerable'.[644] The Guidelines for the identification of EBSAs also refer to the IUCN Red List and do not refer to CITES or CMS. In this context, the IUCN, an authoritative body on conservation science, plays a support role in each three of these regimes. Use of the IUCN Red List as key reference material is not surprising and is justified by its robust scientific approach.[645] By contrast, the CTI-CFF refers to both CITES and the IUCN Red List.[646] The combined application of these different instruments and guidance documents is examined in Chapter 6 below in the context of the implementation of UNCLOS Article 194(5), the identification of depleted, threatened and endangered species and their habitat, as well as the protection of biodiversity.

[639] CITES, Article 4

[640] See Part 2 Chapter 6 Section 6.2.2 for further elaboration on international law

[641] Supra Part 1 Chapter 1 Section 1.4.4

[642] Supra Part 1 Chapter 1 Section 1.4.2

[643] Operational Guidelines for the Implementation of the World Heritage Convention, supra note 257 [19]

[644] Ramsar COP11 Resolution XI/8, Annex 2, supra note 212 [para 36-38]

[645] IUCN Red List Process available https://www.iucnredlist.org/assessment/process; accessed 12 February 2021

[646] Refer to Part 2 Chapter 4 Section 4.2.4

3.1.5 C4 - Vulnerability, fragility, sensitivity, slow recovery of species, habitats, ecosystems or communities

According to the EBSA Training Manual, this criterion focuses on the 'inherent sensitivity of habitats or species to disruption'. However, the terms 'vulnerability', 'fragility' and 'sensitivity' can be confusing. Although they have a specific meaning in ecology, they have a different common meaning outside the academic/specialists research groups and are sometimes used interchangeably.

Theoretically, 'vulnerability can only be evaluated relative to threats' (e.g. specific benthic ecosystems in relation to specific bottom contact fisheries gear – an anthropogenic threat- or a underwater earthquake – a natural threat).[647] However, the many definitions compiled by Dearden and Topelko (2005) from peer-reviewed publication as well as domestic regulations show that vulnerability to specific threats can also be assumed or generalised. For example, it can be assumed if an area is already subject to environmental stresses from human interventions, natural processes (e.g. oil seepage) or both. It can be generalised in the case of small reserves deemed more vulnerable to periodic disturbances than large ones.[648] As further discussed below, EBSA identifications use these two approaches.

Vulnerability can be assessed according to the damage that could occur to the affected habitats and organisms, their resilience to the stressor (either natural or anthropogenic) and the likelihood that it will occur.[649] Vulnerability is also defined as the probability that a feature will be exposed to a stressor to which it is sensitive and requiring a human value judgement.[650] A stressor deviates from a certain range of environmental conditions to which species, ecosystems, habitats or communities may be subject beyond the expected range.

Sensitivity is the degree to which marine features respond to such stress.[651] By contrast, 'fragility' relates to intrinsic characteristics of a species or ecosystems, irrespective of a threat or potential stressor. This is also the approach taken in the EBSA Training Manual.

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[647] EBSA Training Manual [78]

[648] Similarly, Dearden and KN Topelko (2005) highlight that EBSA criteria include 'degree of threats to an area' and are therefore not restricted to ecological or biological significance, supra note 623

[649] EBSA Training Manual [78]

[650] Derous et al (2007) [116], supra note 88. On assessment of vulnerability, see S McLaughlin et al (2002) Socio-Economic Data in Coastal Vulnerability Indices: Constraints and Opportunities, Journal of Coastal Research 36: 487-497

[651] MA Zacharias and EJ Gregr (2005) Sensitivity and Vulnerability in Marine Environments: An Approach to Identifying Vulnerable Marine Areas, Conservation Biology 19: 86-97 [88]

Bax et al show that this criterion (C4) is fully utilised and ranked among the top four in more than 51% of EBSA identifications. However, in the context of EBSAs, vulnerability is generally assessed on the basis of generic threats and predicted effects rather than a measurement of specific effects from a specific activity or activities in a given location (e.g., vulnerability of ice-covered areas to pollution rather than a measurement of potential effects from particular shipping or offshore activities).[652]

Vulnerability can also be used in a restrictive sense (such as in the context of Ramsar Guidelines) to apply only to species that are not listed as endangered but may face a high risk of extinction in the wild in the medium-term future, consistent with the IUCN Red List.[653] An example would be an endemic species with 80% or more of the global population occurring in a limited geographic area that may be exposed to dramatic climate events. The IUCN Red List sets out detailed alternative criteria for a taxon to be considered as 'Vulnerable' which include intrinsic characteristics as well as external stressors.

By contrast, the World Heritage Centre,[654] the IMO[655] and the FAO[656] consider vulnerability in the context of specific threats caused by specific activities and exposure to these threats with a view to regulating these activities and minimizing their impact: bottom trawling for VMEs and restrictions on shipping operations for Special Areas under MARPOL and PSSAs. In these situations, the measures will be adopted based on the level of threat being posed.[657]

However, an area qualifying under criterion C4 (or any other criterion of this set) may be insufficient on its own to justify restrictions on lawful activities at sea under UNCLOS, especially if they are regulated under an independent sectoral regime. The risk of adverse

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[652] However, the EBSA Training Manual highlights that vulnerability can only be assessed with respect to specific threats which makes this aspect of this criterion different from other EBSA criteria that address intrinsic properties of an ecosystem independent of threats. NJ Bax et al (2015), supra note 187

[653] The IUCN Red List recognizes three groups of threatened species with decreasing levels of 'vulnerability': Critically Endangered (CR), Endangered (EN) and Vulnerable (VU). KBA criteria 1.1 and 1.2 on threatened biodiversity also apply to species or ecosystem vulnerability and areas containing habitat important for the survival and recovery of such species or ecosystems. See GJ Edgar (2008) Key Biodiversity Areas as Globally Significant Target Sites for the Conservation of Marine Biological Diversity, Aquatic Conservation: Marine and Freshwater Ecosystems 18: 969-983 [972]

[654] World Heritage Convention Operational Guidelines [99], supra note 257

[655] PSSAs are intended specifically to protect sensitive areas from adverse effects from shipping activities.

[656] VMEs are intended specifically to protect sensitive areas from the effects of bottom trawling.

[657] Fisheries and Oceans Canada distinguishes the relative vulnerability of species or structural habitat features to disturbance (envisaged in criterion #4) from the relative exposure of sites to likelihood of perturbations and consider that the latter should not be included in the identification of sensitive areas, but is an important consideration in selecting management measures for the area. Other authors contend that vulnerability should not be included at all in pure ecological criteria. Despite being convincing from a theoretical perspective, this argument does not seem pragmatic in view of the purpose of the criteria. These criteria are designed to shortlist sites for protective measures and vulnerability (either intrinsic or from external stressors) is critical information for this purpose. DFO Canada (2005) Identification of Ecologically and Biologically Significant Areas, Ecosystem Status Report 2004/006, supra note 624. Derous et al (2005), supra note 88. See also EJ Gregr et al (2012), supra note 652

effects to the marine environment would need to be demonstrated as required according to the applicable sectoral body of rules, depending of the activity concerned.[658]

Some application of this criterion is explicitly included or implicitly covered in all, but two sets of criteria reviewed. Of note, this criterion is the opposite of site 'resistance and resilience', in criterion 10 of this Reference Criteria Set (see below).[659]

3.1.6 C5 - Biological Productivity

EBSA criterion 5 applies to areas containing species, populations or communities with 'comparatively' higher natural biological productivity, at a regional scale, with an underlying intention to identify regions of high productivity at a global scale. According to the EBSA Training Manual, 'How much "higher" is left open to interpretation'. It also provides alternative scientific methodologies that be used as surrogates or indicators to meet this definition. The ASEAN Declaration on MPA criteria also adds the relative importance of ecological as well as human benefits, therefore including implicitly biological productivity without providing additional guidance.

Other conservation-driven instruments do not expressly refer to, or directly value, productivity. Instead, Ramsar and migratory species instruments (as well as KBA criteria) focus on species aggregations (or congregations). As wetlands that are able to support large and diverse aggregations are likely to also be 'relatively' more productive, there may be an overlap; depending on the scale in the assessment of the 'relatively higher productivity'. This is generally true of the criteria applying to aggregations and to feeding areas.[660] Bax et al (2015) find a correlation between areas identified as meeting the productivity criterion and those meeting life-history, endangered and threatened species, fragility and biodiversity criteria.[661] Areas of 'relatively' high biological productivity also meet the criteria for Special Areas under MARPOL and PSSAs.

Although different sets of criteria that seek to identify (explicitly or implicitly) areas of

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[658] According to UNCLOS, States sovereign rights to exploit their natural resources and benefit from all the rights and freedoms in different maritime zones (e.g., freedom of fishing in the high seas and laying of submarine cables) subject to their obligation to protect and preserve the marine environment. See among others, UNCLOS articles 58, 87, 192 and 193.

[659] IOSEA Marine Turtles criterion 1.5

[660] The Ramsar Convention also stresses the importance of wetlands as rich centres of biological diversity and productivity. See Ramsar Guidelines [para. 28]. The IMMA Guidance document explicitly indicates that this criterion 5 (biological productivity) includes IMMA criterion 2.2 'aggregations' and criterion 3.2 'feeding area' and KBA criterion 4.1 'demographic aggregations', supra note 347

[661] NJ Bax et al (2015), supra note 187 [578]

'comparatively' or 'relatively' higher productivity appear to share the same intention, the guidance on the methodology to be applied is less clear and suggests that the criterion may (perhaps) be easy to meet and prone to inconsistencies in application.

This criterion also addresses the call from the 1992 Earth Summit Agenda 21 for states to 'undertake measures to maintain biological diversity and productivity of marine species and habitats' and to 'identify marine ecosystems exhibiting high levels of biodiversity and productivity and other critical habitat areas and should provide necessary limitations on use in these areas'.[662] The Johannesburg Plan of Implementation adopted at the subsequent World Summit on Sustainable Development in 2002 reiterated a call to 'maintain the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas within and beyond national jurisdiction'.[663]

3.1.7 C6 - Biological Diversity

This criterion seeks to identify areas that contain 'comparatively' higher diversity of ecosystems, habitats, communities, or species, or that have higher genetic diversity, thereby using the same 'relative' threshold as under criterion C5 on Biological Productivity, without a clear definition or understanding of the meaning and scale for its application. As is highlighted in the EBSA Training Manual, there is also 'no single agreed-upon definition of "diversity"', so that this criterion can be considered in a number of different ways.

All the sets of criteria reviewed include some focus on biological diversity, albeit sometimes implicitly by focusing on limited subsets of biodiversity.[664] A systematic analysis of correlations between sets of criteria confirmed this qualitative analysis, by demonstrating that this criterion 6 positively correlates with all the other criteria.[665]

The EBSA Training Manual highlights the absence of an agreed methodology to measure diversity and that different factors may be taken into account, including number and relative abundance of different elements (e.g. richness vs. evenness), and measures of variance in these elements (e.g. taxonomic distinctiveness). When species survey data are lacking, habitat characteristics can provide indications of diversity (e.g. habitats of higher complexity).

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[662] United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992 - Agenda 21, Chapter 17 on Protection of the Oceans, All Kinds of Seas, Including Enclosed and Semi-Enclosed Areas, and Coastal Areas and the Protection, Rational Use and Development of their Living Resources, Sections 17.5 and 17.85. Available https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf; accessed 21 Mar 2018.

[663] 2002 Plan of Implementation of the World Summit on Sustainable Development, supra note 501

[664] See criteria for IOSEA Marine Turtles and MARPOL Special Areas in Appendix D

[665] NJ Bax et al (2015), supra note 187 [578]

The specialist literature shows the complexity of assessing marine biodiversity. A biodiversity conservation framework (developed since the 1990s) started working with terrestrial biodiversity and was later customised to meet the different characteristics of the marine environment, especially differences in taxa representation, dispersion of organisms and the level of interactions between abiotic and biotic systems and processes.[666] These included the importance of ecosystems and the mixed biotic-abiotic systems they represent.[667] These studies highlight the importance of conserving biodiversity at different levels of organisation: compositional (species, population, community, ecosystems, etc.), structural (static) and functional (dynamic). Other essential considerations are to also ensure inclusion of representative habitats, distinctive habitats and overall ecological integrity, as well as taking into account spatial changes in diversity (e.g., migrations) and temporal changes (e.g. seasonal processes).[668]

Although this analysis shows the overall consistency in intent between all the different sets of criteria that include the biodiversity criterion, it also points to the risk in inconsistent applications resulting from weak, unclear and insufficient scientific and technical guidance for the application of this criterion.

3.1.8 C7 - Naturalness and/or integrity

EBSA criterion 7 focuses on naturalness defined as an area which has been exposed to a limited amount of human-induced disturbance or degradation,[669] whereas Ramsar criterion 1 focuses on natural or near-natural wetlands, defined as an area which would retain its ecological values.[670] The OUV criteria do not refer to naturalness but to integrity, a measure of the wholeness and intactness of a natural heritage site and its attributes.[671] The concept of 'naturalness' refers to the absence of anthropogenic impacts,[672] whereas the concept of

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[666] SR Palumbi (1992) Marine Speciation on a Small Planet, Trends in Ecology and Evolution 7: 114-118 [115] and MV Angel (1993) Biodiversity of the Pelagic Ocean, Conservation Biology 7: 760-772

[667] RF Noss (1990) Indicators for Monitoring Biodiversity: A Hierarchical Approach, Conservation Biology 4: 355-364; MA Zacharias and JC Roff (2000) A Hierarchical Ecological Approach to Conserving Marine Biodiversity, Conservation Biology 14: 1327-1334

[668] See for instance Roff and Evans (2002) [638], supra note 87

[669] Ottawa Report, supra note 161

[670] Ramsar Guidelines, supra note 208 [para. 117]. The definition adds that this clarification is provided to allow for the listing of sites which are not pristine yet retain ecological values that nonetheless make them internationally important.

[671] World Heritage Convention Operational Guidelines supra note 257 [para. 88]

[672] The work of the Canadian Department of Fisheries and Oceans which has been a critical early contributor to the development of the EBSA criteria frame the criterion of naturalness as a second order criterion (along with representativity) to characterise first order criteria. It defines naturalness to also include the presence of non-native species as an indicator of possibly compromised naturalness. DFO Ecosystem Status Report 2004/006, supra note 624 [2]

'integrity' focuses on 'intactness' and self-sustaining ecological systems.[673]

To some extent, lack of 'naturalness' may be acceptable, provided that the ecological systems and processes still naturally occur. Nevertheless, a site with satisfactory integrity but clear signs of adverse effects from anthropogenic activities may rank lower than one with no such signs. Naturalness may generally be considered as the highest form of integrity.[674]

Neither naturalness nor integrity is expressly mentioned in several suites of criteria. However, integrity (if not naturalness) can be seen as an implied condition in the selection of sensitive areas and maintenance of this integrity is key to successful preservation.[675] The importance of this criterion is also highlighted in that it is generally associated, and therefore appears to be correlated, with uniqueness, fragility and biodiversity. By contrast, this does not appear to be the case with the productivity criterion, which suggests that productive areas are often exploited.[676]

These are the reasons that naturalness and integrity were grouped as complementary attributes of the same criterion #7 in the Reference Criteria Set.

3.1.9 C8 - Representativity

The need for a representative network of MPAs was included in the 2002 Johannesburg Plan of Implementation and is reiterated in Aichi Target 11.[677] However, instead of selecting it as a criterion for the identification of EBSAs, the CBD COP adopted it solely as one of the five

[673] Ramsar Guidelines highlight the importance of naturalness when selecting wetlands, meaning the extent of impact from human-induced changes. Naturalness also refers to ecological, demographic and genetic processes which maintain the structural and functional integrity and self-sustaining capacity of the site being considered. Ramsar Guidelines, supra note 208 [para. 57]

[674] This is also consistent with the EBSA criterion 7 of naturalness which does not require that an area be 'pristine'. Instead, it is a relative measure of naturalness. The site has to rank relatively higher, a measure open to interpretation which requires, however, some information on historical states of the ecosystem considered. See EBSA Training Manual, supra note 166 [22]

[675] See Table 1.7 and discussion in Appendix D to this study

[676] NJ Bax et al (2015), supra note 187 [578]

[677] 2002 Plan of Implementation of the World Summit on Sustainable Development, supra note 501. See also Aichi Target 11 in the Introduction Section 5.3 and note 72

criteria in the establishment of a representative network of MPAs.[678] This appears to have been originally based on the idea that representativity should be treated separately from the EBSA criteria because it should only be applied to areas already meeting the EBSA criteria.[679] This criterion was therefore separated out completely and included in a new discrete set of MPA network criteria.[680] This criterion is intended for larger-scale and more common habitats and communities based on biogeographical subdivisions[681] of the global oceans and regional seas.[682] However, Johnson et al (2018) find gaps in representation of certain taxa and features in several regions in EBSAs identified so far. Another review of marine migratory species and the information used to describe EBSAs further concludes that the inclusion of criteria similar to 'representativity' and 'connectivity' in the EBSA criteria could provide a more robust framework, particularly with respect to migratory species.[683]

Whereas representativity is a un-contested and necessary criterion for establishing MPA networks, several other instruments and authors also include 'representativity' in the first set of ecological criteria designed to identify sensitive areas, rather than solely in the context of

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[678] CBD COP9 Resolution IX/20, UNEP/CBD/COP/DEC/IX/20 [11]. See also Dunn et al (2014), supra note 152 [139]

[679] 2005 Report of the scientific experts' workshop on criteria for identifying ecologically or biologically significant areas beyond national jurisdiction, 6-8 December 2005, Ottawa, UNEP/CBD/COP/8/INF/39, supra note 161

[680] 2007 Expert workshop on ecological criteria and biogeographic classification systems for marine areas in need of protection, Azores, UNEP/CBD/EWS.MPA/1/2. Available https://www.cbd.int/doc/meetings/mar/rwebsa-wspac-01/other/rwebsa-wspac-01-ewsebm-01-02-en.pdf; accessed 21 Feb 2022. See also Dunn et al (2014), supra note 152 [139]

[681] For a discussion of biogeographic classifications for representativeness purpose, see Gregr et al (2012), supra note 622

[682] Representativity is captured in a network when it consists of areas representing the different biogeographical subdivisions of the global oceans and regional seas that reasonably reflect the full range of ecosystems, including the biotic and habitat diversity of those marine ecosystems. CBD COP9 Decision IX/20, Annex II, supra note 29. This is also the perspective of Derous et al (2007) although they acknowledge numerous sets of criteria that include it in the prior selection of sensitive areas (before looking at the establishment of networks of MPAs), supra note 622. See also J Rice and K Houston, Representativity and MPA Networks, Aquatic Conservation: Marine and Freshwater Ecosystems 21: 649-657.

[683] The Convention on the Conservation of Migratory Species of Wild Animals, A Review of Marine Migratory Species and the Information Used to Describe Ecologically or Biologically Significant Areas (EBSAs), Global Ocean Biodiversity Initiative, October 2014. UNEP/CMS/COP11/Inf.23. Available https://www.researchgate.net/publication/282611717_A_review_of_marine_migratory_species_and_the_information_used_to_describe_ecologically_or_biologically_significant_areas_EBSAS; accessed 20 Mar 2022 [52]. D Johnson et al (2018) supra note 187

the second step of establishing a network of sensitive areas and management measures.[684] Of the international and legally adopted sets of criteria reviewed, seven include representativity as a criterion to identify sensitive marine areas. (Appendix 4 Table 8)

3.1.10 C9 - Connectivity

Similarly to representativity, connectivity is not a criterion for identifying EBSAs but it is a condition for establishing a representative network of MPAs. Connectivity allows for linkages whereby protected sites benefit from larval and/or species exchanges, and functional linkages from other network sites. In a connected network, individual sites benefit one another.[685] The need for well-connected protected areas is also emphasized in Aichi Target 11.[686]

Whereas representativity is used in many legally adopted sets of criteria to identify sensitive marine areas, connectivity is not. It is more clearly associated solely with the establishment of networks of MPAs. Thus, the instruments that mention connectivity relate to migratory species for which connected sites that are necessary throughout their life stages are natural candidates for identification as sensitive marine areas (e.g., under Ramsar, IOSEA Marine Turtles and IMMAs). Comparative analysis of competing sets of criteria (including those legally adopted at international, regional or national level, or are proposed by NGOs or authors) also show that connectivity is less often included as a criterion.[687]

However, many authors highlight the importance of biophysical and/or genetic connectivity and

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[684] The ecological literature emphasises that many conservation strategies for marine biodiversity are based on the selection of representative and/or distinct areas. Zacharias and Roff (2000) discuss considerations and data necessary to apply this strategy (on ecosystems, communities or populations) but they do not challenge the principle, supra note 668. Gregr et al (2012) calculate that habitat representation/heterogeneity is the most commonly used criterion in the criteria sets they reviewed, supra note 622. Similarly, Gilman et al (2011) found that it was the second most-used criterion in criteria suites, supra note 605. See also I Asaad et al (2017) Ecological criteria to identify areas for biodiversity conservation, Biological Conservation, 213: 309-316.

[685] EBSA Training manual, supra note 166 [83]

[686] Supra note 72

[687] See Gregr et al (2012), Gilman et al (2011) [3372] and Dearden and Topelko (2005) [34], supra notes 622, 605 and 624 respectively.

suggest that connectivity should be one of the considerations in the identification of sensitive marine sites; it is particularly relevant when considering the appropriate spatial scale of such sites, larval connectivity, different life history stages, and different ecological functions.[688] In recognition of the compelling scientific case, several intergovernmental bodies that adopt law and policy on the protection of the marine environment now place connectivity at the centre of their agenda and strategy.[689] These include the CBD[690] and CMS.[691] The UNGA also adopted resolution 75/271 on 16 April 2021: ' Nature knows no borders: transboundary cooperation – a key factor for biodiversity conservation, restoration and sustainable use'. [692] This resolution highlights the critical role played by connectivity between ecosystems and the need to maintain and enhance it, encourages states to do so, and emphasises the importance of protecting vulnerable ecosystems and their connectivity. It is the first resolution of this type.

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[688] Noss (1990) mentions 'connectivity' as one of the potentially major controllers of species composition and abundance in a terrestrial context. This approach is also critical in the marine context as shown by the abundant literature on this topic in marine ecology, first primarily focused on larval connectivity and no-take reserves. It subsequently extended to the complementarity and connectivity of sites between different life stages or ecological functions (such as, across mangroves, seagrass meadows and coral reefs). See, for example, MR Callum et al (2003) Application of Ecological Criteria in Selecting Marine Reserves and Developing Reserve Networks, Ecological Society of America 13: S215-S228 [S223] and RB Cabral et al (2016) Siting marine protected areas based on habitat quality and extent provides the greatest benefit to spatially structured metapopulations, Ecosphere 7: e01533. DFO Ecosystem Status Report 2004/006 [6] and 2011/049 [4], supra note 624. T Yamakita et al (2015) Identification of Important Marine Areas around the Japanese Archipelago: Establishment of a Protocol for Evaluating a broad area using ecologically and biologically significant areas selection criteria, Marine Policy 51: 136-147 [144]. See also the report on a review of marine migratory species and the information used to described EBSAs and its conclusion that the inclusion of 'connectivity' in the EBSA criteria could provide a more robust framework, particularly with respect to migratory species, supra note 684

[689] Conservation Corridor, Corridor Policy, Digests, 13 July 2021. Available https://conservationcorridor.org/digests/2021/07/ecological-connectivity-in-global-conservation-policy/; Accessed 22 Feb 2022

[690] The Post-2020 Global Biodiversity Framework being developed by the CBD gives priority to ecological connectivity and places it at the centre of several of its goals and targets. See the First draft of the post-2020 Global Biodiversity Framework submitted to the Third meeting of the Open-ended Working Group on the Post-2020 Global Biodiversity Framework, CBD/WG2020/3/3. Available https://www.cbd.int/doc/c/abb5/591f/2e46096d3f0330b08ce87a45/wg2020-03-03-en.pdf; accessed 22 Feb 2022. See also, https://conservationcorridor.org/digests/2021/10/connectivity-in-the-cbd-post-2020-global-biodiversity-framework/; accessed 22 Feb 2022

[691] Consideration of connectivity by the CMS is not new. However, it has taken a new central place in its strategy and in the presentation of its work. Ecological connectivity has been the focus of CMS COP13 in India, 15-22 February 2020. See Press Release of 19 November 2020. Available https://www.cms.int/sites/default/files/un_convention_on_migratory_species_pr_19_nov.pdf; accessed 22 Feb 2022. Subsequently, COP 13 adopted Decisions 13.113 to 13.115 on improving ways of addressing connectivity in the conservation of migratory species. These revised Resolution 12.26. Available https://www.cms.int/sites/default/files/document/cms_cop13_res.12.26_rev.cop13_e.pdf; accessed 22 Feb 2022

[692] UNGA A/RES/75/721 [paras 1, 2, 3, 7, 9] Available https://digitallibrary.un.org/record/3921758?ln=fr; accessed 22 Feb 202

As connectivity has become an un-contested and critical consideration in establishing networks of MPAs, it should also be taken into account in the prior identification of sensitive marine areas.

Also important is that, as with other criteria, processes of connectivity are subject to biophysical changes, including changes in ocean circulation patterns, either seasonally or as a result of different meteorological processes and/or under climate change-driven processes.

3.1.11 C10 - Refugia *against adverse conditions (including from climate change and ocean acidification)*

As previously discussed in Chapter 2 Section 2.2.3, the ASEAN, Fisheries Refugia are defined as

> Spatially and geographically defined, marine or coastal areas in which specific management measures are applied to sustain important species [fisheries resources] during critical stages of their life cycle, for their sustainable use.[693]

Some ecologists prefer a stricter definition, such as Keppel and al. (2012), who define 'refugia' as

> habitats that components of biodiversity retreat to, persist in and can potentially expand from under changing environmental conditions. [694]

However, Keppel and Wardell-Johnson (2012) also insist that they should not be confused with 'refuges', which are

> places that through structures or processes provide shelter from disturbances, predation, herbivory or competition (…), [i.e.] locations providing spatial and/or temporal protection or advantages in biotic interactions over ecological time periods

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[693] Supra Part 1 Chapter 1 Section 2.2.3.1 and note 538

[694] G Keppel et al (2012) Refugia: identifying and understanding safe havens for biodiversity under climate change, Global Ecology and Biogeography, 21: 393-404 [394]

(i.e., within the life span of the relevant organism).[695]

They also distinguish refugia and refuges from 'remnants', that are

> patches of suitable habitats for species intolerant of changed or modified landscapes that prevail in landscapes highly modified by human populations and resource exploitation.[696]

For the Reference Criteria Set, in a pragmatic management approach that includes Fisheries Refugia as defined in the ASEAN, we propose an inclusive definition of refugia, encompassing refuges and remnants. Under this more comprehensive definition, refugia are marine areas which are resistant and resilient to stressors and can act as refuges for organisms from current and future (predicted) stresses, including climate change.

Refugia sites are seen by several authors as a minimum required component in sets of criteria for site networks.[697] Others emphasize that it would be useful for refugia to also be taken into account in the prior identification of sensitive (and valuable) marine areas which may later be included in networks of MPAs.[698] In circumstances where such sites would be identified as being especially important for the life history of endangered and non-endangered species, communities and ecosystems, criteria 2 and 3 of this Reference Criteria Set may also be applicable.

More debatable is where a site may not be important or necessary yet but is predicted to become so in the future. Failure to preserve the ecological functions of this site by protecting it against adverse effects from anthropogenic activities may result in it becoming unsuitable to serve as a refuge when needed. The example considered by Johnson et al (2018) relates to threats to deep-sea areas in the North Atlantic in the context of changes affecting an

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[695] G Keppel and GW Wardell-Johnson (2012) Refugia: keys to climate change management, Global Change Biology 18: 2389–2391 [2389-2390]

[696] Ibid

[697] Keppel et al, ibid, with the definitional caveat previously mentioned. Gilman et al (2011) [3376], supra note 605

[698] I Asaad et al include refugia in 'important area for life history stage', I Asaad et al (2017) Ecological criteria to identify areas for biodiversity conservation, Biological Conservation 213: 309-316

entire deep-sea ecosystem due to a combination of climate change and ocean acidification effects, including a change in the North Atlantic Oscillation.[699] These authors highlight that most of the current MPAs, EBSAs and VMEs in ABNJ in the North Atlantic are, or may be, adversely affected by changes before 2050. They point to the need for additional data on and adaptive management of the North Atlantic. The EU-ATLAS project is developing standardised protocols for predictive mapping of the Atlantic ecosystems that can be used for scenario building at relevant spatial scales and for developing and adapting management measures.[700]

Some sets of legally defined criteria, such as the Ramsar criteria, include an express reference to sites that serve as refugia and/or are resistant and resilient to disturbances (Appendix D Table D10). However, identification of sites predicted to become essential for the survival of species, communities and ecosystems is not included. Considerations of climate change effects and acidification on sensitive marine areas are noticeably absent or limited in the guidelines adopted for the application of different criteria sets . The EBSA Training Manual refers to climate change solely in the context of spatial and temporal variability, two parameters to be taken into account in the application of the EBSA criteria.[701] By contrast, Ramsar Guidelines refer expressly to climate change for the application of several criteria. Criterion 2 on wetlands which support vulnerable, endangered or critically endangered species or threatened ecological communities must be assessed, taking into account climate change effects. Climate change must also be taken into account in the application of criterion 4 to wetlands which provide a refuge at critical stages in species life cycles and/or during adverse conditions.

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[699] D Johnson et al (2018) Climate Change is likely to severely limit the effectiveness of deep-sea ABMTs in the North Atlantic, Marine Policy 87: 111-122

[700] The Atlas-EU Project is a Trans-Atlantic assessment and deep-water ecosystem-based spatial management plan for Europe. Available https://www.eu-atlas.org/about-atlas/atlas-work-package-descriptions; accessed 20 Mar 2022. RE Ross and KL Howell (2013) Use of Predictive Habitat Modelling to Assess the Distribution and extent of the Current Protection of 'Listed' Deep-sea Habitats', Diversity and Distributions 19: 433-445

[701] EBSA Training Manual [69]

[702] Current and predicted effects of climate change on Ramsar-listed wetlands must also be reported by States. Recommended management measures in the context of sea level rise include extension of the landward boundary of mangrove wetlands to allow for landward migration of the mangrove, as well as maintenance of habitat, genetic processes and buffering functions. Climate change and severe events are included as one of the categories of 'factors (actual or likely) adversely affecting the site's ecological character' on which member States are expected to report, with respect to their sites, in the Ramsar Information System. Ramsar Guidelines, supra note 208 [114]

However, ocean acidification is not expressly referred to. In the World Heritage Convention and identification of OUVs, climate change is mentioned solely in the context of the description of threats to listed sites that member states are expected to report on according to the World Heritage Convention Operational Guidelines. Guidelines for Special Areas under MARPOL and PSSAs do not refer to climate change, whereas in the context of VMEs, climate change is only mentioned as another activity that might adversely affect them, along with mining, introduced species, marine litter, microplastics, cable and pipeline laying, etc.

In the face of pressing threats from climate change and ocean acidification on marine ecosystems,[703] and given states' obligations to protect and preserve the marine environment, as well as to mitigate and adapt to the effects of climate change on marine ecosystems,[704] this criterion should arguably be added to the Reference Criteria Set and include current and predicted effects from climate change. This is also consistent with the point made in the 2022 IPCC report that policies designed to respond to pollution threats must also take into account the interactive effects of climate change for better forecasts and management.[705] It is the role of this criterion related to refugia.

3.1.12 Consistency, overlaps and gaps

The dominant observation from the qualitative and quantitative analysis of correspondences between the sets of criteria is that they are consistent, mutually supportive and mostly

[703] IPCC (2014) Climate Change 2014: Impacts, Adaptation and Vulnerability [CB Field et al (eds.)] Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

[704] UNFCCC Articles 3(3) and 4(d) and Paris Agreement Articles 2 (a) and (b) and 5(1). See also supra note 54

[705] IPCC, Climate Change 2022: Impacts, Adaptation and Vulnerability, Working Group II contribution to the Sixth Assessment Report of the IPCC, 2022. (IPCC 2022 a), [Chapter 10, 172]. Available https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_FinalDraft_FullReport.pdf; accessed 10 Mar 2022

overlapping (Appendix F, Tables F2 and F3). This observation is also consistent with the scientific literature and statements by international fora that adopted the criteria.[706]

Criteria 1 to 7 of the Reference Criteria Set are all comparable, equivalent to or overlap with criteria of other sets.[707] The nature of this equivalence, comparability or overlap can take different forms. The most persuasive case of equivalence or comparability is when criteria from different sets use identical, similar or equivalent language; for example, the notion of uniqueness or rarity, which is comparable to an 'exceptional' area and can be extended to a distinctive area (i.e., different, not representative), geographically restricted biodiversity, and irreplaceable sites. Each of these criteria points to a different degree of 'rarity'.[708]

Other typical examples are the criteria of naturalness and of integrity.[709] These two criteria can be equivalent or overlap. For example, 'integrity' can be a characteristic of 'naturalness' and vice-versa, depending on how they are defined. This is the case with criteria 2 and 3 of the Reference Criteria Set on special importance for life history of species and importance for threatened, endangered or declining species and/or habitats. Similarly, criteria to identify different critical habitats of endangered species may satisfy both criteria 2 and 3.[710]

Criterion 4 on vulnerability, fragility, sensitivity, slow recovery of species and habitats is an inclusive criterion which also points to different but comparable criteria. These criteria may be worded primarily to include inherent fragility only, or take into account theoretical vulnerability to some risks, or consider exposure and vulnerability to specific risks.[711]

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[706] Dunn et al (2014), supra note 152 , P Dearden and KN Topelko (2005) Establishing criteria for the identification of ecologically and biologically significant areas on the high seas, Background Paper prepared for Fisheries and Oceans Canada, supra note 624

[707] Appendix F Table F3

[708] Appendix D Table D1

[709] Appendix D Table D7

[710] Appendix D Tables D2 and D3

[711] Appendix D Table D1

Some criteria can also be used to identify a feature which may be used as an indicator or proxy in applying another criterion. For example, areas of high aggregations of species in wetlands can be an indicator of high biological productivity and biodiversity.[712] Another example concerns areas of geomorphological importance (criterion 8 of the OUV criteria) which may correspond to areas of high biodiversity, unique or rare ecosystems/ communities, vulnerable habitats (e.g., seamounts) and/or biological productivity and thus be covered by the Reference Criteria Set or used as a proxy under these criteria.[713]

Analysis of the equivalence, comparability or overlap of each set of criteria with the Reference Criteria Set shows that:

- Most of the criteria in the Reference Criteria Set can be found in the 13 sets of criteria considered except for APEIs (which can be explained by the specific nature of this set of criteria);[714]
- The few criteria without an explicit equivalent in the Reference Criteria Set are likely to have an implicit equivalent or overlap in practice;[715] and
- The alignment between the Reference Set of Criteria and the set of criteria reviewed is generally balanced.[716]

Criterion 8 on representativity, criterion 9 on connectivity and criterion 10 on refugia show more limited overlaps. Criterion 9 on connectivity shows the least overlap, despite being

[712] Appendix D Table D5

[713] Johnson et al (2018) highlight that several EBSAs, including the Orange Shelf Edge EBSA, the East Broken Ridge Guyot EBSA, the Ua Puakaoa Seamounts EBSA and the Shelf Break Front EBSA, were described based on the geomorphic features and their associated effects on productivity in the water column. DE Johnson et al (2018) Reviewing the EBSA process: Improving on Success, Marine Policy 88: 75-85 [80]. Examples of marine world heritage sites which are listed as meeting criterion 8 of OUV criteria include Australia Great Barrier Reef, Shark Bay in Western Australia, Macquarie and Fraser Islands, The Galapagos Islands, The Gulf of Porto, Papahānaumokuākea, Ha Long Bay and Phong Nha-Ke Bang National Park.

[714] See above Part 1 Section 2 Section 2.3.2 and the introduction to Part 1 Chapter 3

[715] These include criteria that tend to be specific to the type of sensitive area considered. They are (i) of a practical nature, (ii) not of a strictly ecological nature, and/or (iii) concern the assessment of threats to the sensitive area considered or the management measures which may be appropriate. For instance, the criterion on vessel traffic characteristics in the context of the establishment of special areas under MARPOL. For full details see Appendix D.

[716] The only three exceptions to this are: the OUV criteria and EAAFP criteria, where one criterion addresses most of the criteria of the Reference Criteria Set; and the APEI criteria for the same reasons as highlighted above. The reasons for the imbalance in the spread of application of the OUV and EAAFP criteria are different. The overall purpose of the OUV criteria is to identify exceptional cultural and natural features either geophysical or biological. The protection of biodiversity is a subset; criteria that deal with this subset are those where overlap can be identified. EAAFP criteria are based on Ramsar criteria which are all included in its criterion 1, hence the over-representation of this criterion.

generally accepted as a guiding principle in MPA network design. By contrast, criteria 8 and 10 can explicitly or implicitly be found in over half of the sets of criteria considered.

Figure 3.1 below shows the dominant utilisation of 'biodiversity' followed by 'uniqueness', life history and 'endangered'.

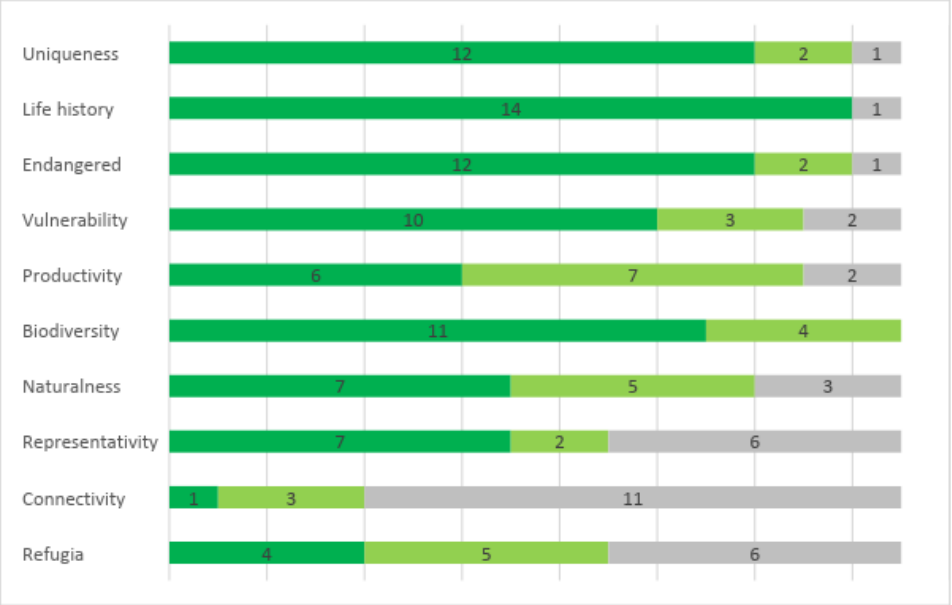

Figure 3.1: Use of the ecological criteria in different instruments

This analysis goes beyond confirming the consistency between different criteria sets for ecological criteria to identify sensitive marine areas acknowledged by many. It also suggests that they are congruent, mutually supportive and/or reinforcing. Given their global vetting and acceptance by states that are members of the different bodies that adopted or acknowledged these criteria, the question arises of their legal value and the extent to which this mutual supportiveness leads to the creation of a globally accepted standard, practice or procedure under UNCLOS, or, if not, of a least a legal norm. This question is examined in Chapter 6. However, that these ecological criteria are congruent and mutually reinforcing does not mean that they are necessarily sufficient to ensure the identification of all sensitive areas

for the purpose of protection and preservation of the marine environment.[717]

Most of the ecological criteria also share the characteristic that their application in different marine locations (e.g. areas of surface water, particular parts of the watercolumn, seabed) changes over time with biogeochemical and physical processes. In addition to natural cycles of variation, these are forced by climate change-induced processes, including the increase in GHG in the atmosphere and effects from human activities. A review process would therefore be necessary to verify their adequate application.

3.2 Non-ecological criteria and considerations

3.2.1 The non-ecological Reference Criteria Set and methodology

The same comparative analysis and Reference Set of Criteria are used for the non-ecological criteria as for the ecological criteria. The comparison covers the 15 sets of criteria reviewed.

To compile the non-ecological Reference Criteria Set, all the non-ecological criteria included in the sets of criteria reviewed in Chapters 1 and 2 are grouped and categorised as follows:

- C11 Economic value, including marine and coastal areas that are sources of food and livelihood at local or national level;
- C12 Social value (non-monetary), such as recreational sea uses and aesthetic value;
- C13 Educational value for education or outreach at local or national level;
- C14 Cultural or traditional use;
- C15 Cultural, religious or spiritual significance, such as areas associated with traditions, ideas, beliefs or outstanding universal significance;
- C16 Scientific research value (including historical value), such as sites used for regulatory monitoring or research.

[717] In addition to a need for more adequate mechanisms to prepare and adapt to adverse effects of climate change discussed above in the context of the criterion on refuges against adverse conditions, many publications and reports point out that the criteria do not adequately respond to climate change effects.A study conducted by the Global Ocean Biodiversity Initiative (GOBI) for the CMS highlights a need for more research in the spatial and temporal distributions of marine migratory species, including considerations of representativity and connectedness in the EBSA process. The report reviews the application of the EBSA process to migratory species and identifies a strong overlap of criteria. They find that this overlap plays a role in 80% of EBSAs identification. Supra note 684 [51]

For each non-ecological criterion, equivalents in other sets of criteria are set out in Table 3.3 below. Other pragmatic considerations are summarised in Figure 3.2 below. As with non-ecological criteria, several suites of criteria combine non-ecological criteria with additional considerations. Such additional considerations or pragmatic considerations may relate to legal, institutional, administrative and/or financial measures, and/or the social and political feasibility of adopting the designation considered in each instrument (the pragmatic considerations).

Table 3.1: Correspondences between ecological criteria to identify sensitive marine areas in families of legal instruments aimed at marine environmental protection

Identification Criterion (abb. 'c.')	**EBSA[718]**	**Wetland of Int'l Importance[719]**	**Area of OUV[720]**	**Critical habitats for migratory species[721]**	**ASEAN Heritage Parks and MPA Criteria (abb. 'c.')**
C1 - Uniqueness or rarity or distinctiveness	*Identical except Representativity not included*	Included in Ramsar c. 1 with respect to wetlands; also, an alternative c. for a wetland to qualify as a 'wetland of International Importance'. Also, c. 2 on threatened ecological communities as they include those with restricted geographic distribution or habitat	Can concur with OUV c. 7 with respect to superlative natural phenomena or areas of exceptional beauty	IOSEA Marine Turtle Site Network c. 1.4 on rare species IMMA c. 2.1 on small and resident populations and c. 4.1 on important genetic, behavioural or ecologically distinctive characteristics EAAFP: same as Ramsar	c. 8 (additional) on uniqueness (Heritage Parks) C. 3.5 (MPAs)
C2 - Special importance for life history of species	*Identical*	Includes Ramsar c. 4 applied to wetlands although the latter also refers to the provision of refuge during adverse conditions; Also includes Ramsar C7 and 8 for fish	OUV c. 10	Includes 'critical habitats' that CMS instruments seek to protect.	Heritage Parks: c. 4 on areas of high conservation importance. Also, c. 10 (additional) which includes habitat of importance for endangered or precious biodiversity flora and fauna MPAs: overlap with dependency c. 3.3
C3 - Importance for threatened, endangered or declining species and/or habitats	*Identical except 'Threatened ecological communities' not mentioned*	Included in Ramsar c. 2 with respect to vulnerable, endangered or critically endangered species ('declining species' are not mentioned in the Ramsar c. but 'vulnerable' species are).	OUV c. 10 with refers to threatened species of OUV	CMS-listed species meet the definition of threatened, endangered or declining species. So, this c. is met even when not stated.	Heritage Parks: C. 4 on areas of high conservation importance. Also, c. 10 (additional) which includes habitat of importance for endangered or precious biodiversity flora and fauna MPAs: Mentioned under 3.5 (uniqueness) and 3.8 (vulnerability). Also, possibly 3.3 (dependency)
C4 - Vulnerability, fragility, sensitivity, slow recovery of species and habitats	*Identical*	Ramsar c. 2 also refers to vulnerable species and threatened ecological communities. The language of 'fragility', 'sensitivity' and 'slow recovery' is not Mentioned in Ramsar c.	No express reference in selection c. for identification of OUV but implied in c. 10 and can be part of the demonstration of existing	Endangered status/fragility/habitat sensitivity of the species is assumed. EAAFP: Vulnerability, sensitivity or fragility of the habitat is not an express c. for selection but threatened	Heritage Parks: C. 4 on areas of high conservation importance and c. 10 (additional) (theoretically as selected sites are likely to present these characteristics but details on the rational for designation is

[718] CBD COP9 Decision IX/20

[719] Ramsar Guidelines, supra note 208

[720] World Heritage Convention Operational Guidelines, supra note 257

[721] Two sets of criteria are included here in addition to general provisions of the CMS Convention and of COPs resolutions. Those developed to identify IMMAs and those developed for inclusion in the IOSEA Marine Turtle Site Network, supra Part 1 Chapter 1 Section 1.4

Identification Criterion (abb. 'c.')	EBSA[718]	Wetland of Int'l Importance[719]	Area of OUV[720]	Critical habitats for migratory species[721]	ASEAN Heritage Parks and MPA Criteria (abb. 'c.')
			adverse effects needed to obtain World Heritage site status.	ecological communities can be EAAFP Flyway.	limited). MPA c. 3.8 (vulnerability)
C5 - Biological productivity	*Identical*	No direct reference. Possible indirect reference through quantitative minima for subspecies, species or families of waterbirds or fish or other wetland-dependent species being supported by a wetland (Ramsar c. 5/6/7/9) and c. 8 on wetlands as important source of food for fish and other wetland-dependent species.	Not included	No direct reference but possible (unconfirmed) overlap with c. on aggregations and feeding areas	Heritage Parks: No direct reference but possible application/overlap of c. 4/7/10 MPAs: c. 3.7 (productivity). Also 4.1 (regional source)
C6 - Biological diversity	*Identical*	Ramsar c. 3 at scale of biogeographic region Also includes Ramsar c. 7 with respect to fish	Includes OUV c. 9 and 10	Diversity of listed or target species/sub-species, abundance or aggregations are conditions for an area to qualify as a 'critical habitat'	Heritage Parks: Partly included in c. 4 on areas of high conservation importance MPAs: 3.1 (diversity)
C7 - Naturalness (and integrity)	*Identical*	Not an express Ramsar c. but implied in most c.. Ramsar c. 1 refers to near-natural wetlands, meaning that they 'continue to function in what is considered an almost natural way.[722]	Called 'integrity' in this family of instruments. Also, a condition for the designation of an OUV as a World Heritage site. Can overlap w c. 10	Not direct reference but implied if considered as 'integrity' as defined under Ramsar	Heritage Parks: c. 1/3 MPAs: 3.2 and 3.6
C8 - Representativity	*Not included but in c. for network of MPAs*	Defined as a typical example of a particular wetland type found in a region[723] and included in Ramsar c. 1	Possibly included in OUV c. 10	c. 4.1 of IOSEA Marine Turtle c. c. 1 of EAAFP (from Ramsar C.)	Heritage Parks: c. 2 MPAs: c. 3.4 (representativeness) and 4.2 (regional representativeness)
C9 - Connectivity	*Not included but in criteria for network of MPAs*	Not included	Not included	c. 4.2 of IOSEA Marine Turtle c.. Also 4.3. Also, a guiding principle in CMS COP12 Res 12.11 Also, implicit component in IMMA c.	Not included in criteria for Heritage Parks or in MPA c. but possible overlap, in some situations, with site 'integrity' and intact ecological processes
C10 - Refugia against adverse conditions OR site resistance and resilience	*Not included*	Included in Ramsar c. 4	No explicit reference but possible inclusion in c. 10	c. 1.5 Resistance and resilience of IOSEA Marine Turtle c implicit in EAAFP (from Ramsar) Not in IMMA	Possibly included in c. 1 on ecological completeness of an area - capable to regenerate with minimal human intervention

[722] Ramsar Guidelines, supra note 208 [para. 117]

[723] Ramsar Guidelines, supra note 208 [para. 114]

Table 3.2: Correspondences of ecological criteria to identify sensitive marine areas in different families of legal instruments aiming to regulate uses at sea

Identification Criterion (abb. 'c')	**Special Areas under MARPOL**	**PSSAs**	**VMEs**	**APEIs**	**LC/LP**	**OPRC**
Uniqueness or rarity or distinctiveness	C. 2.4	C. 1.1 and c. 1.11	C. 1	No explicit reference	No explicit equivalence. Possible overlap w c. 3	May be included in c. 2.1/2.2
Special importance for life history of species	C. 2.3 and 2.4	C. 1.2 and 1.7	C. 2	No explicit reference	C. 5/6/7	C. 2.1/2.2
Importance for threatened, endangered or declining species and/or habitats	C. 2.1	C. 1.2. Also, c. 1.1	C. 1 and 2	No explicit reference	Implicit inclusion in c. 3,5,6 and 7	C. 2.1/2.2
Vulnerability, fragility, sensitivity, slow recovery of species and habitats	C. 2.1 and 2.4	C. 1.10- May also overlap w. c. 1.3	C. 3 and 4	No explicit reference	No explicit equivalent. Possible overlap w c. 3,5 and 7	C. 1/2.1/2.2/3 [All]
Biological productivity	C. 2.2	C. 1.6	No explicit reference but overlap with c. 2 on functional significance of habitat. e.g., seamounts	No explicit reference	Overlap with c. 4	C. 1/3
Biological diversity	No explicit reference. Possible overlap with c. 2.4 (critical habitats for marine resources)	C. 1.5	No explicit reference but possible overlap with c. 5 aimed at structural complexity	No explicit reference but included in guiding principles	C. 3	C. 2.1/2.2
Naturalness (and integrity)	Not included	C. 1.8 (naturalness) and c. 1.9 (integrity)	Not included but integrity of VMEs' ecological functions is implied condition	An indicator for CCZ APEIs network design	Not included	Not included
Representativity	Not included	C. 1.4 with high threshold. Must be an 'outstanding/illustrative ex.'. Overlap w. 1.11 representative biogeographic types	Not included	An indicator for CCZ APEIs network design	Not included	Not included
Connectivity	Not included	Not included	Not included	Not included	Not included	Not included
Refugia against adverse conditions OR site resistance and resilience	Not express reference. May be indirectly included in c. 2.4 where such areas are of critical importance for the support of marine ecosystems such as LMEs	No express reference. Possible overlap with c. 1.2	No express reference. Possible overlap with c. 5	Not included	Not included	Not included

Table 3.3: Correspondences of non-ecological criteria developed to identify sensitive marine areas in different families of legal instruments

Parent instrument	Economic value (C11) Productive area - Source of food for living resources Essential for local population, incl. artisanal/subsistence fisheries Benefits local/national economy	Social value (C12) Non-monetary benefits to society: - recreational sea uses, - aesthetics/natural beauty - clean water/less pollution	Educational value (C13)	Cultural or traditional use (C14) Traditional or representative sea-use	Cultural, religious, spiritual significance (C15) Associated with traditions, ideas, beliefs or outstanding universal significance	Scientific research value incl. historical value (C16) Site used for regular monitoring or research	Other considerations Legal, institutional, financial considerations or social/political feasibility
EBSA	C1- Biological Productivity		Not express		-	Not express	-
RAMSAR	C8- Food source for fish stocks	Not express. Valued once listed[724]	Not express	Not express. Valued once listed	Not express. Valued once listed[725]	Not express	-
OUV	-		-	C5- Outstanding ex of sea use which is representative of a culture(s) or human interaction with the environment	C6- Associated with living traditions, ideas, beliefs, artistic or literacy works of outstanding universal significance	Implied – C8 major stages in earth history	Additional condition to gain status of World Heritage Site: Adequate protection and management system
IOSEA	C3.6- Ancillary benefits for communities (monetary)	C3.6- Ancillary benefits for communities (non-monetary)	C3.3- Opportunity for educational and outreach activities	C3.1- Traditional beliefs/practices of cultural, religious and/or spiritual significance (in relation to marine turtles)	C3.1- Traditional beliefs/practices of cultural, religious and/or spiritual significance (in relation to marine turtles)	C2.4- Site used for research and monitoring	C2.1- Legal framework C2.2- Measures taken C2.3- Participatory work with locals for compliance and enforcement C2.5- Long-term financial and human resources available

[724] Ramsar Strategic Framework Guidelines highlight that socio-economic and cultural values must be considered along with the maintenance of the ecological character of the listed Ramsar Site, supra note 208 [paras. 35, 94-95]

[725] Ibid

Parent instrument	Economic value (C11)	Social value (C12)	Educational value (C13)	Cultural or traditional use (C14)	Cultural, religious, spiritual significance (C15)	Scientific research value incl. historical value (C16)	Other considerations
EAAFP	-				-	-	
IMMAs	-				-		-
ASEAN Heritage Parks	Not express	-	Possibly implied. C4 – High conservation imp. Evokes respect for nature	C9 – High ethnobiological significance	C9 – High ethnobiological significance	-	C5&6- Legal protection and management plan in place
ASEAN MPAs	C2.1 Commercially important species C2.2 Direct and indirect eco. benefits	C1.2- Public safety/health C1.3 - Recreation C1.5 – Aesthetics C1.9-Model for natural resources/human use	C1.8- Education and public awareness -	C1.4- culture -	C1.4- culture	C1.8- Education and public awareness (incl. for research/monitoring as 'control' site)	C1.1- Support by local communities suggests feasibility and likely success C5.4,5.5&5.6- practical feasibility
Special Areas under MARPOL	C2.2- High natural productivity C2.3 – Important for important marine species C2.4 – Critical habitats for marine resources				-		-
PSSAs	C1.6-Productivity C2.1-Social or economic dependency C2.2- Human dependency	C2.1-Social or economic dependency - -	C3.3 - Education - -	C2.3- Cultural heritage - -	C2.3- Cultural heritage	C3.1 -Research C3.2 – Baseline for monitoring studies	-
OPRC	C3 – Human uses	C3 – Human uses	C3 – Human uses	C3 – Human uses	C3 – Human uses	C3 – Human uses	-
VME	-				-	-	
APEIs	-				-	-	
LC/LP	C4- Fishing areas C7- Shipping lanes C10- Engineering: mining, cables, etc.	C1- Recreational uses C2- Areas of beauty or significant cultural or historical value	No express equivalent	C2- Areas of beauty or significant cultural or historical value	C2- Areas of beauty or significant cultural or historical value	C3- Scientific importance	-
KBAs	-				-		-

3.2.2 Comparison of the non-ecological criteria

One of the first observations that stand out from both Table 3.3 and Figure 3.2 is the relatively low number of non-ecological criteria in the sets of criteria considered, compared to the ecological criteria previously considered. The average presence of ecological criteria from the Reference Criteria Set in the 15 sets of criteria is 11.3, as opposed to six for the non-ecological criteria from the Reference Criteria Set in the same 15 sets of criteria. (average derived from Figure 3.1 and 3.2).

Furthermore, five sets of criteria did not include any non-ecological criteria[726] and three sets of criteria include only one 'non-ecological' criterion.[727] This criterion is the economic criterion relating to biological productivity and support for living resources. It is therefore both an ecological criterion and one that relates to the economic value of an area, the basis on which it is also included in the 'non-ecological criteria'.

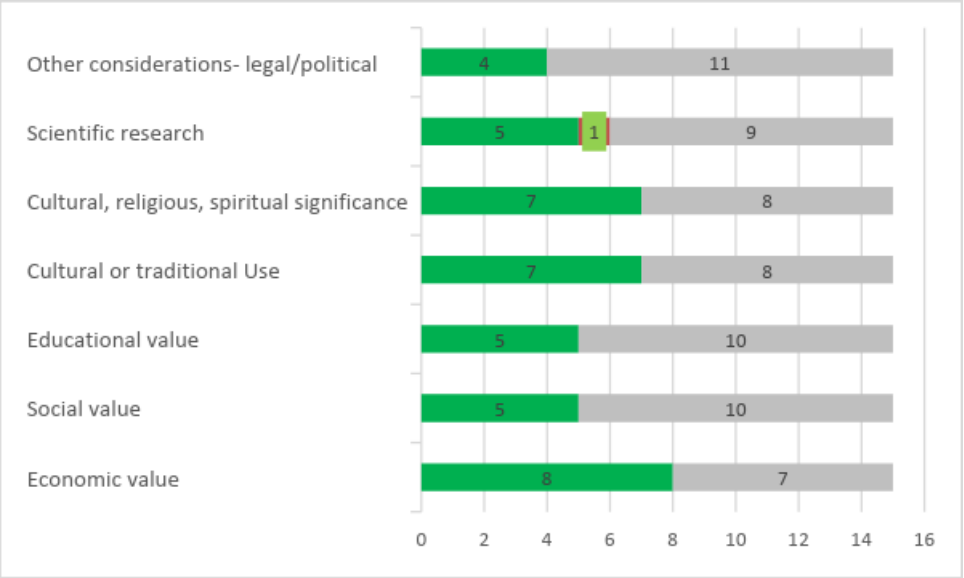

Figure 3.2: Use of the non-ecological criteria in different instrument

Of the 15 sets of criteria, eight sets did not include 'pure' non-ecological criteria (a criterion which does not overlap with ecological criteria). This can be explained by the purpose and

[726] Sets of criteria for EAAFP, IMMAs, VMEs, APEIs and KBAs

[727] Sets of criteria for EBSAs, Ramsar Sites and Special Areas under MARPOL

subject matter of the instrument for which they were adopted, which was primarily focused on ecological and environmental conservation or protection. Three different situations can be distinguished:

- conservation-driven instruments which include, at most, management measures limited to monitoring, assessment of adverse effects or broadly worded provisions aimed at the sustainable use of resources;[728]
- criteria developed in the context of specific sea-use regimes involving marine areas distant from local populations: fishing on deep-sea ecosystems (VMEs) and deep seabed mining in the CCZ (APEIs); and,
- criteria developed to implement MARPOL Special Areas based on the text of MARPOL as adopted in the late 1970s.[729]

The remaining seven sets of criteria, which all include three or more 'non-ecological criteria', share an important characteristic. They are all designed to not only identify marine areas that present certain characteristics of sensitivity or value, but also to impose specific regulation of sea uses in these areas. Three different situations can be distinguished here also:

- the OUV criteria are a first step towards designating a site as a World Heritage Site. Although the WHC is a conservation-driven convention, it includes a strict set of mechanisms to ensure protection and conservation of the site under the purview of the World Heritage Commission;[730]
- criteria designed to guide the selection of ASEAN Heritage sites, the creation of ASEAN MPAs and a network of MPAs comprising critical habitats for marine turtles: they presuppose the existence of domestic laws, regulations and measures to protect and preserve the marine environment within them. They present a national (as well as regional) perspective on MPAs which cannot be limited to ecological criteria. It is therefore unsurprising that they include a detailed list of non-ecological criteria;

[728] The CBD and Ramsar Convention are good examples of specific management measures being limited to monitoring and assessment of effects. Sets of criteria developed for migratory species (EAFFP and IMMAs) and KBAs are limited to purely ecological site identification criteria

[729] Supra Part 1 Chapter 2 Section 2.1.1

[730] Supra Part 1 Chapter 1 Section 1.3

- criteria developed in the context of the regulation of activities concerned not only with the environmental impact that these activities may have but also with their effects on other legitimate uses of the sea. Such criteria include the PSSA criteria, those developed in the context of dump-site selection for the disposal of waste at sea under the 1972 London Convention and its 1996 Protocol, and the criteria for oil sensitivity mapping under OPRC.

Therefore no clear trend demonstrates broad acceptance of or practice for including non-ecological criteria in technical and scientific suites of criteria adopted or recognised to identify sensitive marine areas.

The economic value of an area is the only criterion included implicitly or explicitly in more than half of the sets of criteria reviewed. 'Cultural or traditional uses' and 'cultural, religious or spiritual significance' are included in seven sets. Scientific research is included in six sets.

Several reasons can be proposed to explain these differences between ecological and non-ecological criteria. First, the focus of the instruments primarily on ecological aspects appears to be a feature determining the scope of the criteria for the identification of sensitive areas in this context. Second, this difference in treatment of ecological and non-ecological criteria may also be partly linked to a fundamental difference in states' rights and obligations with respect to the environment compared to other values attributed to the oceans. States have the sovereign right to exploit their natural resources, but it is subject to their obligation to protect and preserve the marine environment.[731] States' freedom to fish on the high seas is also subject to their obligation to protect and preserve the marine environment.[732] All activities under the control of activities of states are subject to their obligation to protect and preserve the marine environment.

Some of the non-ecological criteria may also correspond to other obligations under UNCLOS, other treaties, and general international law. Marine scientific research may be seen as both a

[731] UNCLOS Article 193

[732] UNCLOS Articles 87 and 192

right and an obligation in the context of the obligation to monitor the effects of activity that may adversely affect the marine environment[733] and the obligation to monitor the status of sensitive areas identified under different international instruments (see section 3.3 below). Given the global degradation of the marine environment and observation of the global reach of adverse effects from human activities, [734] there is a growing push for protection of the marine environment to expand knowledge before irreversible changes prevent it.[735]

Finally, with respect to the protection of certain social, cultural, traditional, religious and/or spiritual values, they may also be protected under human rights law.[736]

3.3 Listing procedure, monitoring, reporting and review

This section compares, across the different sets of criteria and their parent legal instrument, the extent of the steps expected from states once a sensitive area has been identified. The following steps identified in the review of the different instruments in chapters 1 and 2 are examined below:

- Listing of sensitive areas, voluntarily or under the control of an international body;
- Recording in a public/online repository by an international body;
- Monitoring of the sensitive areas, activities within and changes in environmental status;
- Reporting and consequences of non-reporting or changes in status;
- Review of areas identified.

This analysis, as detailed in Table 3.4 below, shows some notable commonalities and

[733] UNCLOS Articles 143 and 238 on rights relating to marine scientific research and 204 and 206 on obligations on all activities

[734] The Second World Ocean Assessment (WOA II) highlights the South China Sea as one of the marine systems most affected by nutrient pollution, as well as a place of acute adverse effects from climate warming, bottom trawling, pollution, eutrophication, oil and gas production, and coastal infrastructure development. Available https://www.un.org/regularprocess/sites/www.un.org.regularprocess/files/2011859-e-woa-ii-vol-ii.pdf; accessed 22 Mar 2022

[735] See for example the argument of Thiel in the context of protection of reference areas on the High Seas; H Thiel, Unique science and reference areas on the High Seas, in From Managing Risks to Biodiversity and the Environment on the High Seas, including such Tools as Marine Protected Areas – Scientific Requirements and Legal Aspects, Proceedings of the 2001 Vilne Conference, 2001. See also the 2021-2030 United Nations Decade of ocean sciences for Sustainable Development coordinated by the International Oceanographic Commission (IOC). Available https://ioc.unesco.org/ocean-decade; accessed 22 Mar 2022

[736] This topic goes beyond the scope of this study.

distinctions driven by the difference in the object and purpose of the different parent instruments.

First, most of the instruments aim to have sensitive areas identified as meeting their set of criteria on a centralised list. Inscription on the list is also often subject to control by an international body composed of representatives from states parties to the instrument. As Redgwell (2007) proposes, 'nomination subject to scrutiny' is an attempt to strike 'a balance between the recognition of state sovereignty, on the one hand, and of the common interest, on the other'.[737]

Second, the conservation-driven instruments also provide for a central and public repository of areas identified and their characteristics. Most of them also expect monitoring and reporting of activities in these areas and of changes to their ecological characteristics.

Third, sea-use regulations, by contrast, focus on limiting effects on sensitive areas, to which they may even restrict access. They do not include measures to monitor these areas. However, another obligation of monitoring may be triggered under UNCLOS Article 204, especially if the activity is likely to adversely effect the marine environment, e.g., cause harm to living resources and marine life.[738]

3.4 Criteria adopted in a regional context and (in)consistencies with the Reference Criteria Set

Four of the most developed legal and institutional mechanisms to identify sensitive marine areas in a regional context are examined below and compared *inter se* and with the Reference Criteria Set:

- Special Areas under the Antarctic Treaty System and the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), a regime often viewed as having a prominent influence in the development of international marine

[737] C Redgwell, Protecting Natural Heritage and its Transmission to Future Generations, in AA Yusuf (ed.) Standard-Setting at UNESCO: Normative Action in Education, Science and Culture, UNESCO, Martinus Nijhoff, 2007 [271]

[738] See Part 2 Chapter 6 Section 6.2.2

environmental law;[739]

- Areas in need of protection under the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention);[740]
- Specially Protected Areas of Mediterranean Interest (SPAMIs) under the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA and Biodiversity Protocol); [741] and,
- Protected Areas under the Protocol Concerning Specially Protected Areas and Wildlife (SPAW Protocol)[742] in the Wider Caribbean Region.

[739] DR Rothwell (2000) Polar Environmental Protection and International Law: the 1991 Antarctic Protocol, Environmental Journal of International Law 11: 591-614

[740] 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic, 22 September 1992 (entered into force on 25 March 1998) 2354 UNTS 67 [OSPAR Convention]

[741] Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, 10 June 1995 (entered into force on 12 December 1999); [SPA and Biodiversity Protocol] to the Convention for the Protection of the Mediterranean Sea against Pollution, 16 February 1976 (entered into force on 12 February 1978) [Barcelona Convention]. The SPA and Biodiversity Protocol replaces the 1982 Protocol concerning Mediterranean Specially Protected

[742] Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, 18 January 1990 (entered into force on 18 June 2000) [SPAW Protocol]

Table 3.4: Listing, monitoring, reporting and review of sensitive areas across instruments

Source instrument	Sensitive area type	Listing	Unique repository	Obligation of monitoring of changes and activities	Reporting	Review of sites
CBD	EBSA	Yes- Based on regional workshops reports, review by technical body and COP	Yes- CBD Secretariat/website	Yes- CBD Article 7(c)&(d)	No process- voluntary update agreed in principle	No- under consideration
Ramsar Convention	Ramsar Sites	Yes- Voluntary listing only	Yes- Secretariat/website	Yes	Reporting obligation in Article 3 COP is competent to review changes in ecological character- Article 6(2)(c)&(d)	Optional- COP can raise it Montreux record with agreement of state party only. Site boundaries can also be changed
World Heritage Convention	OUV	Yes, state party Tentative List first, then review and decision by World Heritage Committee	Yes, World Heritage List under responsibility of World Heritage Committee	Yes- Article 5(d)	Yes- periodic reporting expected (6 years). No express obligation in the Convention but Decision of 29th GC	Yes- review of 'state of conservation' List of World Heritage in danger
CMS	Areas necessary for migratory species	No (listing under MOUs)	No	Yes- COP Resolution	Unspecified	No- On-going review process
	IOSEA Marine Turtles MOU	Under construction - regional Task Forces	Yes- Secretariat, on MOU Website	Yes- in Management Plan in MOU	Yes- in Management Plan in MOU	Yes- planned
	EAAFP	Yes, voluntary	Yes- website	No	No	Unclear
ASEAN Heritage Park	ASEAN Heritage Park	Yes- ASEAN Centre for Biodiversity	Yes- ASEAN Centre for Biodiversity	No established process at ASEAN level	No established process at ASEAN level	No established process at ASEAN level
ASEAN MPAs	ASEAN MPAs	No	No. Recorded by ASEAN Centre for Biodiversity	No established process at ASEAN	No established process at ASEAN level	No established process at ASEAN level

Source instrument	Sensitive area type	Listing	Unique repository	Obligation of monitoring of changes and activities	Reporting	Review of sites
				level		
Shipping	Special Areas under MARPOL	Yes- IMO	No- Also on nautical charts and in sailing directions	No	No	No
	PSSAs	Yes-IMO	No- Same as above	No	No	Voluntary
	Routeing Measures	Yes- IMO for measures adopted through the IMO	No- Same as above	No	No	No
	OPRC / Sensitivity	Voluntary- At national level	No	At national level only	No	At national level only
Fishing	VMEs	Yes- FAO	Yes- FAO	Unclear	Will depend on RFMO/As having authority over VME	Unclear
UNCLOS / ISA	APEIs	Yes-ISA	Yes-ISA	Unclear	Unclear	Unclear
London Convention & Protocol	Dump-site selection	NA (no sensitive area identified under this instrument)	NA (no sensitive area identified under this instrument)	Only with respect to dumping which may impact sensitive areas	Only with respect to dumping which may impact sensitive areas	NA (no sensitive area identified under this instrument)

3.4.1 Sensitive areas under the Antarctic Treaty System[743] and the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR)[744]

Several categories of 'special' areas were created by Annex V to the 1991 Protocol on Environmental Protection to the Antarctic Treaty Area Protection and Management:[745]

- Antarctic Specially Protected Areas (ASPAs) for any area of environmental, scientific, historic, aesthetic or wilderness values or a combination or scientific research, to prohibit access;[746]
- Antarctic Specially Managed Areas (ASMAs) where activities are being or may be conducted, to assist in the planning and co-ordination of activities;[747]
- Historic Sites and Monuments (HSMs) for sites or monuments of recognized historic value.[748]

However, of these three special areas, only ASPAs are considered for this comparative analysis as they are the only areas that are marine and identified for their particular sensitivity or value; therefore, they are comparable to the 15 types of sensitive areas created under international law and reviewed so far. The list of criteria for the identification of ASPAs includes ecological and non- ecological criteria. They are set out in Table 3.5 below with the corresponding criterion from the ecological and non-ecological Reference Criteria Sets previously established.

Additionally, CCAMLR provides for the identification by the Commission for the Conservation

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[743] 1959 Antarctic Treaty, 1 December 1959 (entered into force 23 June1961) 402 UNTS 71

[744] 1980 Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980 (entered into force on 7 April 1982) (CCALMR) 19 ILM (1980) 841

[745] 1991 Protocol on Environmental Protection to the Antarctic Treaty, 4 October 1991 (entered into force on 14 January 1998); 30 ILM (1991) 1455, Annex V on Area Protection and Management, 18 October 1991 (entered into force on 24 May 2002), adopted in Recommendation XVI-10 at the 16th ATCM in Bonn

[746] 1991 Protocol on Environmental Protection to the Antarctic Treaty, Annex V on Area Protection and Management, Article 3

[747] 1991 Protocol on Environmental Protection to the Antarctic Treaty, Annex V on Area Protection and Management, Article 4

[748] 1991 Protocol on Environmental Protection to the Antarctic Treaty, Annex V on Area Protection and Management, Article 8. So far, it primarily concerns sites on land

of Marine Living Resources of 'conservation needs' and the designation by the same Commission' of protected species' and 'of the opening and closing of areas, regions or sub-regions for purposes of scientific study or conservation, including special areas for protection and scientific study'.[749] In implementing this provision, the Commission has adopted a General Framework for the Establishment of CCAMLR Marine Protected Areas in 2011, which also includes identification criteria.[750]

Table 3.5: Criteria for the identification of Special Areas under the Antarctic Treaty System and MPAs under CCALMR

Antarctic Specially Protected Areas [ASPAs]	**CCAMLR MPA Framework Identification criteria**	**Equivalence in the ecological and non-ecological Reference Criteria Sets**
Representative	Representative ecosystems, biodiversity and habitats at appropriate scale to maintain integrity	C8- Representativeness
Important or unusual assemblages of species (incl. major colonies of breeding birds or mammals)	Key ecosystem processes, habitats and species, including populations and life-history stages	C2- Special importance for life history of species
Only known habitat of any species	Vulnerable areas, incl. rare or highly biodiverse habitats and features	C4- Vulnerable species or habitats
No human interference	-	C7- Naturalness
Other area for environmental, scientific, historic, aesthetic or wilderness values or a combination or scientific research	Features critical to the function of local ecosystems	ASPAs- C12- Social value C16- Scientific research CCALMR - Overlap w. C2 and C3- for threatened species and habitats + C6-Biological diversity
-	Areas to maintain resilience or the ability to adapt to the effects of climate change	C10-Refugia or site resilience
Outstanding geomorphological features	-	C1- Uniqueness or proxy for C6-Biological diversity
Important for scientific research	Scientific reference areas for monitoring	C16- Scientific Research
Outstanding aesthetic and wilderness value	-	C12- Social non-monetary value
Monuments of recognised historic value	-	C12- Social non-monetary value

[749] CCALMR, Article IX(2)(d) and (g)

[750] Decision of the Commission for the Conservation of Marine Living Resources, Conservation Measure 91-04 (2011). Available https://cm.ccamlr.org/en/measure-91-04-2011; accessed 21 Feb 2022

Notably, CCAMLR identified VMEs in the Convention area as including 'seamounts, hydrothermal vents, cold water corals and sponge fields' and adopted conservation measures whereby bottom fishing operations are subject to a prior assessment by the Scientific Committee to determine whether they 'would contribute to having significant adverse impacts on VMEs'. The Commission subsequently determines whether bottom fishing is permissible and under what conditions.[751]

3.4.2 Identification of sensitive areas under the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention)[752]

The OSPAR Convention's Annex V Protection and Conservation of Ecosystems and Biological Diversity of the Maritime Area[753] provides for the adoption of 'necessary measures to protect and conserve the ecosystems and the biological diversity of the maritime area, and to restore, where practicable, marine areas which have been adversely affected'[754] and 'to develop means, consistent with international law, for instituting protective, conservation, restorative or precautionary measures related to specific areas or sites or related to particular species or habitats'.[755]

In order to identify areas in need of protection, and prioritise and develop an adequate MPA network, the OSPAR Commission adopted recommendations and guidelines, in particular:

- Criteria for the Identification of Species and Habitats in need of Protection and their method of Application;[756]

[751] CCAMLR Conservation Measure 22-06 (2017) Bottom fishing in the Convention Area. Available https://cm.ccamlr.org/measure-22-06-2017; accessed 21 Feb 2022. This measure is no longer applicable.

[752] 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic, 22 September 1992 (entered into force on 25 March 1998) 2354 UNTS 67 [OSPAR Convention]

[753] Adopted on 23 July 1998 and entered into force 30 August 2000. See https://www.ospar.org/site/assets/files/36552/03_bremen_statement_english.pdf; accessed 20 Mar 2022

[754] OSPAR Convention Annex V Article 2(a)

[755] OSPAR Convention Annex V Article 3(1)(b)(ii)

[756] OSPAR 2019/03. Available https://www.ospar.org/documents?v=40948; accessed 21 Feb 2022

- Guidelines for the identification and selection of MPAs in the OSPAR Maritime Area;[757]
- Recommendation 2010/2 on a Network of MPAs.

Table 3.6: Criteria for the identification of areas in need of protection under OSPAR

Identification of possible sites	Equivalence in the ecological and non-ecological Reference Criteria Sets
Threatened or declining species and habitats/biotopes according to the criteria adopted for the identification of habitats and species in need of protection (Texel-Faial criteria)[758]	C3- Threatened, endangered or declining species, habitats or ecosystems. Can also overlap with C1- Unique/rare/distinctive
Important species and habitats/biotopes that are not threatened/declining according to the Texel-Faial criteria [759]	C2- Special importance for life history of species and C4- Biological productivity. Can also overlap with C1- Unique/rare/distinctive
Ecological significance: supports high proportion of species at any stage in life cycle, feeding, breeding, resting, spawning etc. areas, high biological productivity	C2- Special importance for life history of species and C5- Biological productivity
High biological diversity	C6- Biological diversity
Representativity	C8- Representativity
Sensitivity	C4- Vulnerability and sensitivity
Naturalness	C7- Naturalness
Level of threat	Can be included in an enlarged understanding of C4- Vulnerability to include exposure and threats from external stressors
Value for scientific research and monitoring	C16- Scientific Research

The Guidelines for the identification and selection of MPAs include ecological and non-ecological criteria and considerations. These ecological criteria include all the EBSA criteria with the addition of representativity, which is also included in the larger Reference Criteria Set (Table 3.6). An important feature of this regime is the establishment of an OSPAR list of threatened and/or declining species and habitats (at regional level). OSPAR and

[757] OSPAR 2003/17 as amended by BDC 2007 (BDC 2007 Summary Record (BDC 07/12/1, § 343b), and BDC 2016 (BDC 16/9/1, §5.27 and Annex 13)

[758] These include six criteria: Global importance, regional importance, rarity, sensitivity (being intrinsic sensitivity rather than exposure to external threats), keystone species/ecological significance (for habitats) and status of decline

[759] Area is important for other species and habitats/biotopes as identified by the ongoing OSPAR (Texel-Faial) selection process on the basis of global importance, regional importance, rarity, sensitivity (being intrinsic sensitivity rather than exposure to external threats), keystone species/ecological significance (for habitats)

the North East Atlantic Fisheries Commission (NEAFC) took the initiative of convening workshops with the CBD for the identification of EBSAs in the North-East Atlantic, thereby demonstrating their consistent approach to identifying sensitive marine areas.[760]

In addition, three considerations which do not have an equivalent criterion are worth noting: restorability of the site, degree of acceptance and political/financial feasibility, and potential for success.

3.4.3 Specially Protected Areas (SPAs) and Specially Protected Areas of Mediterranean Interest (SPAMIs)

The 1995 Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA and Biodiversity Protocol) adopted under the Barcelona Convention[761] provides *inter alia* for the identification and compilation of 'inventories of the components of biological diversity important for its conservation and sustainable use'[762] and their monitoring. Parties must 'identify processes and categories of activities which have or are likely to have a significant adverse impact on the conservation and sustainable use of biological diversity and monitor their effects'. [763]

These general obligations are implemented through the establishment of Specially Protected Areas (SPAs) and Specially Protected Areas of Mediterranean Importance (SPAMIs) following four objectives which also serve as identification criteria:

- Representativity
- Habitats in danger of disappearing
- Habitats critical to the survival, reproduction and recovery of endangered or endemic species of flora or faun

[760] The identification of EBSAs in the North Atlantic is still pending, awaiting advice by the International Council for the Exploration of the Sea (ICES, OSPAR's scientific adviser) to 'redefine' EBSAs in this area. See ICES Advice in June 2013. Available http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/OSPAR-NEAFC%20EBSA%20review.pdf and http://www.ices.dk/news-and-events/news-archive/Pages/ICES-released-advice-on-ecologically-and-biologically-significant-Atlantic-areas.aspx#; accessed 21 Feb 2022

[761] Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (adopted on 16 February 1976, entered into force on 2 December 1978, was amended and renamed on 10 June 1995) 1102 UNTS 27 [Barcelona Convention]

[762] SPA and Biodiversity Protocol Article 3(3)

[763] SPA and Biodiversity Protocol Article 3(5)

- Sites of particular importance because of their scientific, aesthetic, cultural or educational interest.[764]

By contrast, SPAMIs are defined as areas that

- are of importance for conserving the components of biological diversity in the Mediterranean;
- contain ecosystems specific to the Mediterranean area or the habitats of endangered species
- are of special interest at the scientific, aesthetic, cultural or educational levels.[765]

Table 3.7: Criteria for the identification of SPAMIs

Criteria	Equivalence in the ecological and non-ecological Reference Criteria Sets
Uniqueness (in a Mediterranean context)	C1- Uniqueness
Natural representativeness (in a Mediterranean context)	C8- Representativeness
Diversity (in a Mediterranean context)	C6- Biological diversity
Naturalness (in a Mediterranean context)	C7- Naturalness
Habitats that are critical to endangered, threatened or endemic species (in a Mediterranean context)	C2- Special importance for life history of species and C3- Endangered, Threatened and endangered species, habitats and ecosystems. Partial overlap with C4-Vulnerability
Cultural representativeness	C15- Cultural significance
Area having scientific, aesthetic, cultural or educational interest AND value for research or education on natural environment	C12- Social value C13- Educational Value C16- Scientific Research

The SPA and Biodiversity Protocol obliges the parties to establish a 'List of SPAMIs', and sets a procedure for establishing this List, recording of changes in the status of

[764] SPA and Biodiversity Protocol Article 4

[765] SPA and Biodiversity Protocol Article 8(2)

SPAMIs, listing of endangered or threatened species, EIAs for activities that could significantly affect protected areas and species, and reporting and research obligations. Annex I to the Protocol on Common Criteria for the Choice of Protected Marine and Coastal Areas that could be included in the SPAMI List further develops the general criteria included in the Protocol as set out in Table 3.7. Comparison with the Reference Criteria Set shows that criterion 5 on biological productivity has no explicit equivalent. Neither does criterion 11 on economic value, whereas the other non-ecological criteria find equivalent concepts. However, criterion 10 on refugia would only apply in the context of endangered, threatened or endemic species, where it may be viewed as a 'critical habitat'.

According to the last update in end 2020, the SPAMI List includes 39 sites across the Mediterranean basin with the majority being located in the west and close to the coast.[766] This pattern may reflect the listing procedure established in the Protocol. The listing is based on state proposals for areas 'in a zone already delimited, over which it exercises sovereignty' or jointly by the states concerned if the area proposed is a zone under the jurisdiction of several states, is partly on the high seas or concerns an area where limits have not been defined.[767]

The EBSA Mediterranean Regional workshop to identify EBSAs in the Mediterranean was informed by the SPAMI List and work carried out by the Regional Activity Centre for Specially Protected Areas in the Mediterranean. This led to a proposal for 86 areas from eight sub-regions that span the Mediterranean.[768] The CBD EBSA Workshop adopted different biogeographic units leading to a proposal of 17 EBSAs, most of which include the areas from the earlier proposals.[769] Some candidate EBSAs were, however, considered to be lacking sufficient scientific evidence, but to be strong candidates with improved data in the

[766] SPAMI List. Available https://www.rac-spa.org/spami; accessed 19 Nov 2022

[767] SPA and Biodiversity Protocol Article 9(2)

[768] Synthesis Report on the Work Carried Out Regarding the Description of EBSAs in the Mediterranean, UNEP/CBD/SBSTTA/16/INF/8

[769] The workshop participants were divided into four working groups: (i) eastern part of the Mediterranean, (ii) western part of the Mediterranean, (iii) central part of the Mediterranean; and (iv) the Adriatic Sea

future.[770] Questions arise from this difference in approach and the extent of the influence (if any) of this CBD EBSA identification work on the identification of SPAMIs and the development of MPA networks in the Mediterranean Sea.

3.4.4 Identification of sensitive areas under the 1990 Caribbean's Specially Protected Areas and Wildlife Protocol (SPAW Protocol)

The SPAW Protocol to the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (Cartagena Convention)[771] requires parties to establish protected areas in order to conserve, maintain and restore:

- representative types of coastal and marine ecosystems
- habitats and their associated ecosystems critical to the survival and recovery of endangered, threatened or endemic species
- productivity of ecosystems and natural resources that provide economic or social benefits
- areas of special biological, ecological, educational, scientific, historic, cultural, recreational, archaeological, aesthetic, or economic value.[772]

The SPAW Protocol also provides a procedure for identifying, selecting and listing protected areas, EIAs for activities that would have an adverse environmental impact on protected areas and species, and for protection, reporting and research obligations by state parties. Annexes I to III include agreed lists of threatened, endangered, protected and endemic species requiring different levels of protection from the highest in Annex I to the lowest in Annex III.[773]

The 2010 Guidelines and Criteria for the Evaluation of Protected Areas to Be Listed under the SPAW Protocol (SPAW Guidelines) further develop the initial ecological and non-ecological criteria for identifying, selecting and listing protected areas. (Table 3.8)

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[770] For example, the Eratosthenes seamount (Area#79 in the Levantine Sea). Two other candidate EBSAs were not retained by the CBD COP12: the Algero-Tunisian Margin and the Alboran Sea and Connected Areas, UNEP/CBD/DEC/XII/22 [55]

[771] Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (adopted on 24 March 1983, entered into force on 11 October 2011) 1506 UNTS 157 [Cartagena Convention]

[772] SPAW Protocol Article 4

[773] The lists in Annexes I to III are reviewed and updated by the SPAW COPs.

Table 3.8: Criteria for the identification of Protected Areas under the SPAW Protocol [774]

SPAW Criteria	Equivalence in the ecological and non-ecological Reference Criteria Sets
Representativeness	C8- Representativeness
Conservation value for species/subspecies/population at any stage of life cycle to preserve then as functioning member of their ecological communities and prevent them becoming threatened or endangered	C2- Life history stage
Rarity	C1- Uniqueness
Naturalness	C7- Naturalness
Critical habitats to endangered, threatened or endemic species or species listed in Protocol Annexes	C2- Special importance for life history of species and C3- Endangered, Threatened and endangered species, habitats and ecosystems. Partial overlap with C4-Vulnerability
Diversity	C6- Biological diversity
Connectivity/coherence	C9- Connectivity
Resilience	C10- Refugia, resilience
Productivity	C5- Biological Productivity and C11- Productivity/Economic value
Cultural and Traditional Use	C12- Social value C14- Cultural or traditional use. Likely overlap with C15- Cultural, religious, spiritual significance
Socio-economic benefits	C11- Economic value C12-Social Value

Comparison of these criteria with the Reference Criteria Set shows that 14 out of the 16 reference criteria find one or several equivalent criteria in the SPAW criteria; all the ecological criteria are found. The only two missing non-ecological criteria are criteria 13 and 16 on educational and scientific research value of some areas. However, they are not excluded from the scheme. Rather, they are not viewed as criteria on which to select an area. They are viewed instead as a necessary attribute of the management framework designed for the areas that are selected.[775]

[774] Available https://www.car-spaw-rac.org/?Procedure-for-listing-Protected-Areas-under-the-SPAW-Protocol; accessed 21 Feb 2022

[775] SPAW Guidelines Section C

3.4.5 Comparative analysis

Table 3.9 presents a comparison of the criteria from the four regional mechanisms investigated in this section with the Reference Criteria Sets for ecological and non-ecological criteria. It shows the consistency of the criteria of the Reference Criteria Set with the criteria developed in the context of four other regional seas. It therefore further confirms the general acceptance of most of the 10 ecological criteria of the Reference Criteria Set.

Table 3.9: Comparison of identification criteria from developed regional agreements and mechanisms

RCSs	Antarctic SPAs and CCAMLR MPA criteria	OSPAR MPA identification criteria	SPAMI criteria	SPAW criteria
C1- Uniqueness or rarity or distinctiveness	x	x	x	x
C2- Special importance for life history of species	x	x	x	x
C3- Importance for threatened, endangered or declining species and/or habitats	x	x	x	x
C4- Vulnerability, fragility, sensitivity, slow recovery of species and habitats	x	x	x	x
C5- Biological productivity	-	x	-	x
C6- Biological diversity	x	x	x	x
C7- Naturalness (and integrity)	x	x	x	x
C8- Representativity	x	x	x	x
C9- Connectivity	-	-	-	x
C10- Refugia against adverse conditions OR site resistance and resilience	x	-	-	x
C11- Economic value	-	-	-	x
C12- Social value	x	-	x	x
C13- Educational value	-	-	x	- (in management framework only)
C14- Cultural or traditional use	-	-	x	x
C15- Cultural, religious, spiritual significance	-	-	x	x
C16- Scientific research value	x	x	x	- (in management framework only)

Criterion 9 on connectivity is the only one to not be found in three of the four sets of regional criteria. Criterion 5 on biological productivity and 10 on refugia can only be found in two out of four sets.

Adoption of non-ecological criteria is more uneven. Whereas the SPAMI and SPAW criteria (for the identification of protected areas in the Mediterranean Sea and in the wider Caribbean region respectively) include most of the non-ecological criteria, the criteria applicable for the Antarctic and North Atlantic do not, with the exception of scientific research value (C16). This may be explained by the framing of the parent instruments, which are primarily focused on protection against environmental degradation from human activities.

3.5 Conclusion

This analysis of 19 sets of criteria demonstrates the systematic presence of most of the 10 ecological criteria of the Reference Criteria Set, with connectivity and refugia being less generally used. However, the absence of connectivity from the set of identification criteria for independent sites does not mean that connectivity is excluded from the guidelines for identifying and selecting sites in creating a network. Furthermore, the global recognition of connectivity as a critical element in the design of successful interventions for the protection of the marine environment is more recent and may therefore be included into the suites of criteria in the future.

With respect to the absence of an express equivalent criterion for refugia, this may be linked to the perception of the need for such refugia in the context of the subject matter of each instrument and perhaps to the perception of the need being linked to developing science on the understanding of the steps needed to adapt to the effects of climate change in the marine environment.[776]

The inclusion of non-ecological criteria is different and appears to be based primarily on the underlying objective of the instruments being implemented with the criteria and whether they

[776] Johnson et al (2018) supra note 700. See also D Johnson and E Kenchington (2019) Should Potential for Climate Change Refugia Be Mainstreamed into the Criteria for Describing EBSAs, Conservation Letters: 12:e12634. Available https://conbio.onlinelibrary.wiley.com/doi/epdf/10.1111/conl.12634; accessed 22 Mar 2022

are primarily focused on ecological values or are more holistic.[777]

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Part 1, which includes Chapters 1 to 3, investigated 21 sets of scientific criteria adopted for the identification of different types of sensitive marine areas. These 21 sets of criteria include 12 sets adopted in the context of a global instrument or designed to be applied globally. Nine sets of criteria were adopted in a regional context: five apply in Southeast Asia. The other four apply in other regional seas. Overall, 19 sets of criteria have been adopted, endorsed or officially recognised by an intergovernmental body.

This investigation showed the extent of adoption by states, globally and regionally (in the context of the SCS), and provided the different components of sensitive areas under international law, a key part of the first research question examined in Chapters 1 and 2. It also demonstrated that the ecological criteria in the proposed Reference Criteria Set provides a comprehensive and accurate description of generally accepted criteria for the identification of sensitive areas reviewed in these two chapters and that it encompasses all of them. These are: (C1) - Uniqueness or rarity; (C2) - Special importance for life history of species; (C3) - Threatened or endangered or declining species or habitats; (C4) - Vulnerability, fragility, sensitivity, slow recovery; (C5) -Biological productivity; (C6) - Biological diversity; (C7) – Naturalness; (C8) – Representativity; (C9) – Connectivity; and, (*C10)* - Refugia or site resistance or resilience.

The Reference Criteria Set was then used to compare the different sets of ecological criteria and found overall consistency between them, despite some differences, mostly linked to the context and scope of the parent or source instruments. This overall consistency was further confirmed by the comparison with criteria developed in the context of four regional seas and their respective legal and institutional regimes (for the Mediterranean Sea, the Caribbean sea, the North Atlantic and the Antarctic).

[777] GC Ray (2015) Marine Protected Areas: past legacies and future consequences 'You can't know where you're going unless you know where you've been', Aquatic Conservation: Marine and Freshwater Ecosystems 25: 1-5 and S Wells et al (2016) Building the Future of MPAs – Lessons From History, Aquatic Conservation: Marine and Freshwater Ecosystems 26: 101-125

However, the comparison between the non-ecological criteria of the Reference Criteria Set and the other sets of criteria showed that even if some of them were reflected in certain sets of criteria there was no clear trend of general adoption in sets of criteria to identify sensitive areas. This does not mean that areas cannot be identified as sensitive areas on non-ecological grounds. Rather, it suggests that the consideration of non- ecological criteria requires a different approach and analysis that would require a new analysis and review of the methodology focused on each criterion, as they are all very different. These are therefore not considered for the purpose of Part 2.

Part 1 also identifies the instruments (and related sets of criteria for the identification of sensitive marine areas) that are applicable in the SCS and are therefore examined in Part 2.

Part 2 discusses the application of the criteria in Southeast Asia, and their legal status and significance more generally.

Part 2 – Application to Southeast Asia

This Part responds to the second research question and subquestions: What could be the result of the application of the Reference Criteria Set to the SCS, including the prospects for this application and the significance of the findings beyond the SCS. These questions are addressed in Chapters 4 to 6.

Chapter 4 investigates and discusses the first three sub-questions of the second research question. These focus on:

- sensitive marine areas that have been identified under international law in the SCS and contiguous bodies of water;
- whether the same areas have been identified under different legal instruments and their related set of criteria, and if so, whether the same criteria were used for the identification under different instruments or family of instruments; and
- state practice, as illustrated by this analysis.

Chapter 5 reviews scientific peer-reviewed publications to apply the scientific data available for the Spratly seamounts area in the SCS to the Reference Criteria Set, prior to considering whether this area (or part of it) could theoretically qualify as a potential sensitive area under any of the applicable legal regimes that include a set of criteria to identify sensitive marine areas.

At the interface of law and science, Chapter 6 applies international law to the technical and scientific criteria. It discusses the legal status of the technical and scientific criteria and why they matter. It first considers them within their respective regime and as a whole, as a source of informal law-making, examining their potential normative intent and effect, their congruence, mutual supportiveness, legitimacy and support by state-practice, and their shaping role in the emergence of a global normative web. Finally, they are considered in the context of the implementation of UNCLOS, especially Article 194(5).

Chapter 4: Multi-designation of sensitive marine areas in Southeast Asia

This chapter focuses on sites identified as sensitive marine areas (once or multiple times) under different instruments and compares commonalities and differences for these different identifications or designations, especially with respect to the criteria set out for these identifications or designations. Given the small number of multi- designated sites in the SCS, the geographic scope was extended to adjacent basins of the SCS that involve the same littoral states as the SCS.[778]

4.1 Sensitive areas identified in Southeast Asia under different instruments

4.1.1 Description of areas identified under one instrument

All the sensitive coastal and marine areas identified in Southeast Asia under international and regional instruments, discussed in Chapters 1 and 2, were compiled in a single list of 94 sensitive coastal and marine areas.[779] (See Map in Figure 4.1 below) This list includes areas identified or proposed for identification[780] as:

- EBSAs under the CBD[781]
- Wetlands of international importance under the Ramsar Convention[782]
- OUVs under the World Heritage Convention[783]
- network sites for marine turtles under the IOSEA Marine Turtle MOU[784]

[778] Additional adjacent basins are the Straits of Malacca and Singapore (the Andaman Sea is not included), Sulu-Sulawesi Seas (Sulu, Celebes and Molucca Seas) and Java Seas. The southwestern Pacific along Papua (easternmost State of Indonesia) and the northeast Indian Ocean along the islands of Sumatra and Java are also included.

[779] See Table G1 in Appendix G (Available https://tinyurl.com/5n8anv89; accessed 24 Feb 2022); also shown in Figures 4.1 and 4.1. Some of the lists compiled in Chapters 1 and 2 were limited to the SCS. These were extended with other marine and coastal sites from Southeast Asia that the same geographic scope is applied under each instrument unless the instrument does not extend to the entire geographic area, such as for Fisheries Refugia.

[780] These include areas proposed by States and pending confirmation or additional data or areas announced by States as being areas for which they are compiling the necessary data

[781] See Part 1 Chapter 1 Section 1.1 on EBSAs and particularly Table 1.4

[782] See Part 1 Chapter 1 Section 1.2 on Ramsar Sites and particularly Table 1.8

[783] See Part 1 Chapter 1 Section 1.3 on areas of OUV and particularly Table 1.11

[784] See Part 1 Chapter 1 Section 1.4.2 on the CMS

- sites of the EAAFP flyway[785]
- ASEAN Heritage Parks[786]
- PSSAs[787]
- Fisheries Refugia.[788]

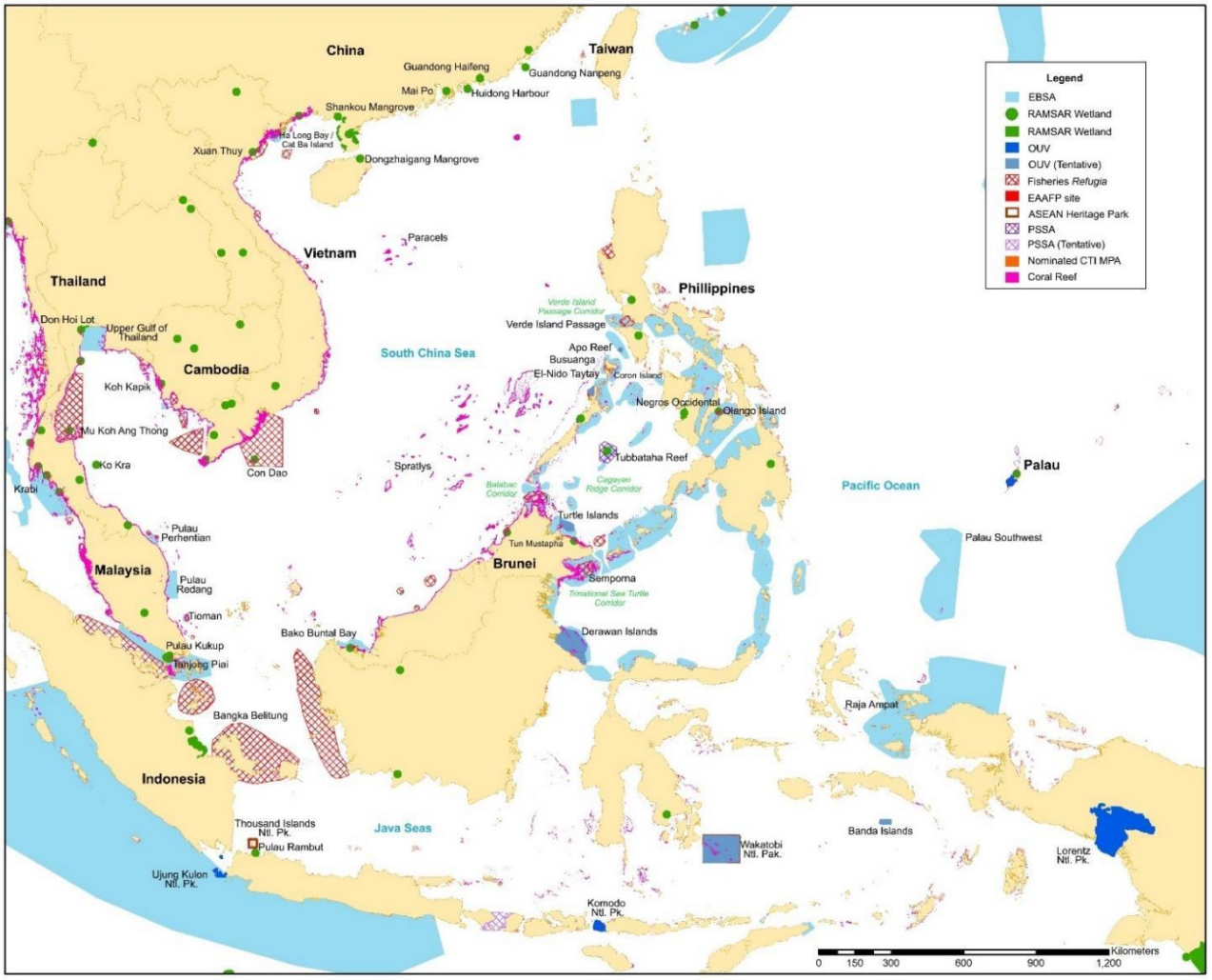

Figure 4.1: Map of Sensitive Areas identified under an international or regional instrument in Southeast Asia

[785] List of EAAFP Network Sites as of February 2018. Available http://eaaflyway.net/wp-content/uploads/2018/02/List-of-FNS-_Feburary2018_Total-135.pdf; accessed 24 Feb 2022

[786] See Part 1 Chapter 1 Section 1.5.1 on the identification of ASEAN Heritage Parks

[787] See Part 1 Chapter 2 Section 2.1.2 and in particular notes 450 with respect to Philippines's PSSA on Tubbataha Reefs. For pending applications from Vietnam, Malaysia and Indonesia, see note 444

[788] See Part 1 Chapter 2 Section 2.2.3

The most common identifications made in Southeast Asia under global instruments are EBSAs and Ramsar Sites, followed by OUVs. (Figure 4.2) Fisheries Refugia is the regional type of sensitive area with the highest number of potential identifications.
However, at the time of data analysis, the extent of the measures to be adopted was still under discussion.[789]

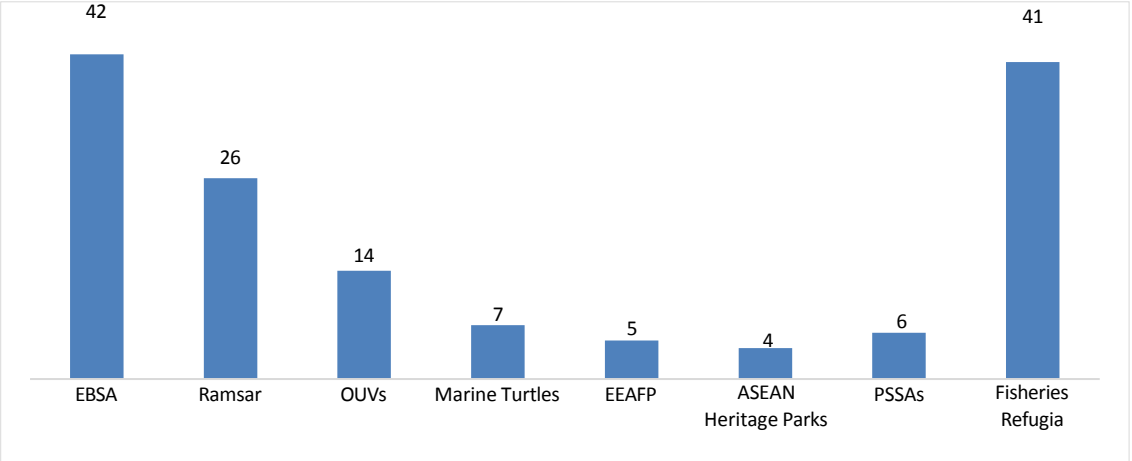

Figure 4.2: Sensitive Areas identified and under consideration under an international or regional instrument in Southeast Asia. [Some areas are identified under several instruments and can therefore be included several times.]

Figure 4.3[790] below shows sensitive marine areas that are the subject of one or several identifications under different instruments. Of the 94 sensitive marine and coastal areas identified in Southeast Asia:

- 60 areas are the subject of identification/proposal under only one instrument; and,
- 34 areas are identified/proposed under more than one instrument, meaning that more than a third of the sensitive areas are the subject of overlapping identifications;
- 32 of these overlapping identifications/proposals concern two or three instruments; and
- Only two sites are the subject of identification/proposal under more than three instruments: Turtle Islands Wildlife Sanctuary (identified in four instruments) and Tubbataha Reefs (identified in seven instruments).

[789] A small number of pilot sites have been identified since, but it is still early days for this new category and more extensive measures are still under consideration. See Chapter 2 Section 2.2.3

[790] The map includes all the sensitive areas identified or proposed for identification in Southeast Asia and discussed in Chapters 1 and 2. The full list is available at Appendix G Table G1, supra note 774

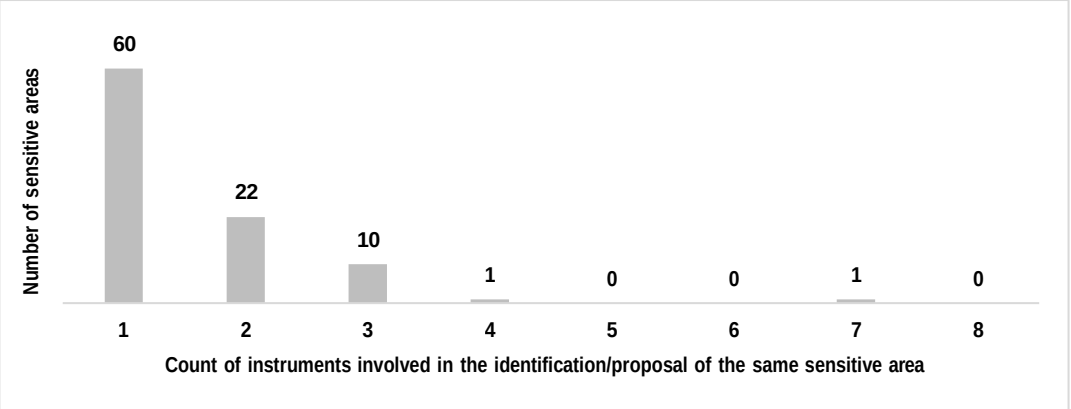

Figure 4.3: Sensitive Areas subject to overlapping identifications

Figure 4.4 provides a more detailed representation of the types of instruments involved in the identification of sensitive areas under one or several instruments. First, 45% of the sensitive areas identified under only one instrument are Fisheries Refugia. These are identified for fisheries management purposes, for implementation under the ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries in Southeast Asia.[791] (Figure 4.4 (a))

The next two types of sensitive areas with the highest number of single identifications are EBSAs (23.33%)[792] and Wetlands of International Importance identified under RAMSAR (21.67%).[793] They involve around half of the Fisheries Refugia that are not the subject of another identification. (Figure 4.4 (a)) However, they are also the most common types of identification overall. (Figure 4.4 (b)) This observation is further discussed in the next section, in the analysis of the areas that are the subject of multi- identifications.

Other types of sensitive areas that can be the subject of single identifications, can also have as many or more sites that are the subject of two or more identifications. For example, 67% (28 out of 42) of EBSAs identified in Southeast Asia are also the subject of other identifications (Figure 4.4 (b)). Ramsar Sites and ASEAN Heritage Parks share the same feature: half of the sites identified under each instrument is identified only under this instrument when the other half is also identified under other instruments. Fisheries Refugia is the category of sensitive

[791] See Part 1 Chapter 2 Section 2.2.3

[792] See Part 1 Chapter 1 Section 1.1

[793] See Part 1 Chapter 1 Section 1.2

areas with the least number of areas that are also identified as sensitive areas under other instruments (34%, 14 out of 41). (Figure 4.4 (b))

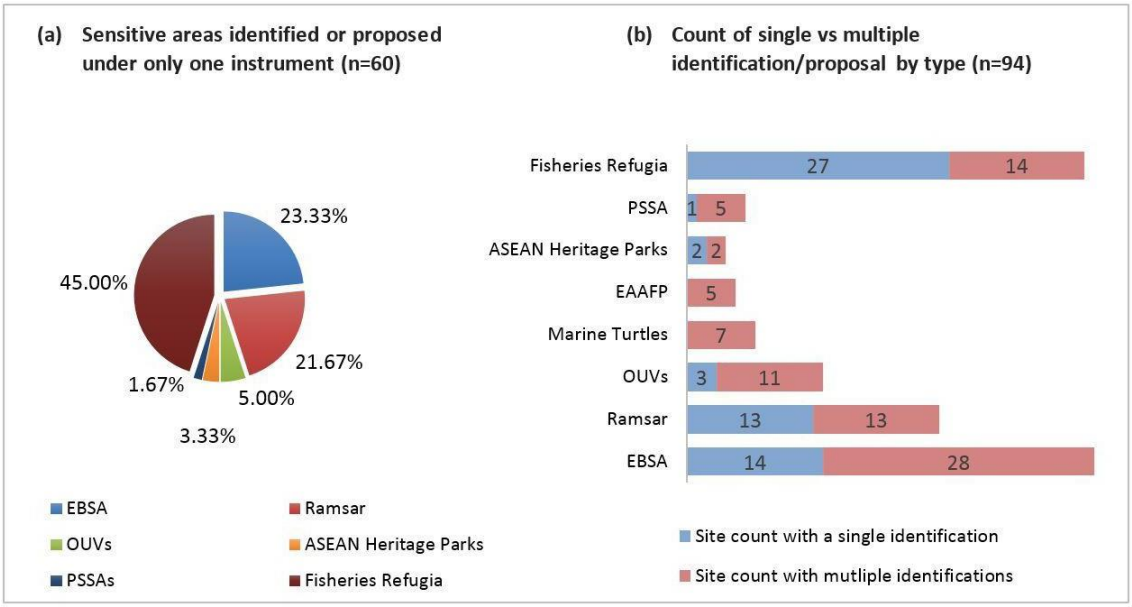

Figure 4.4: Sensitive Areas in Southeast Asia (a) subject to only one identification and, (b) by type, single vs. multiple identifications or proposals

By contrast with sites that are the subject of many single identifications, two types of sensitive areas are both subject to at least two identifications. These are sensitive areas in the network sites of the Marine Turtle MOU and in the EAAFP Flyway. (Figure 4.4 (b))

To understand these differences, Sections 4.2 and 4.3 below investigate the potential relationship between different types of identifications, the correlation between the concordance observed and the commonality of criteria of each type of identification, both in general and for the sensitive areas identified in Southeast Asia. The evolution of identifications over time is also discussed.

4.1.2 Description of sensitive areas identified in Southeast Asia under two or more instruments

The full list of the 34 sensitive areas which are the subject of two or more identifications or proposals under different instruments are listed in Table G.2 of Appendix G and are summarised by type in Figure 4.5(a) below.

Of the 85 identifications associated with these 34 sites, it is important to note that 55 identifications have been confirmed, acknowledged or published, depending on the applicable procedure under the applicable instrument. However, 30 identifications proposed by one or several states are not confirmed yet or are the subject of additional data gathering

to complete the proposal ((b)). Such tentative identifications only concern the identifications of OUVs, PSSAs, sites of the IOSEA Marine Turtles MOU Network and Fisheries Refugia. (Figure 4.5 (c)) Three of the other four types of sensitive areas do not include a repository or public record listing sites that may be proposed by states, prior to confirmation under the relevant procedural rules.[794] The fourth type of sensitive area is EBSAs. As the region has already been considered for identification under the CBD, no new proposal can be made under this instrument until a procedure is adopted for proposals of new areas for identification as an EBSA.[795]

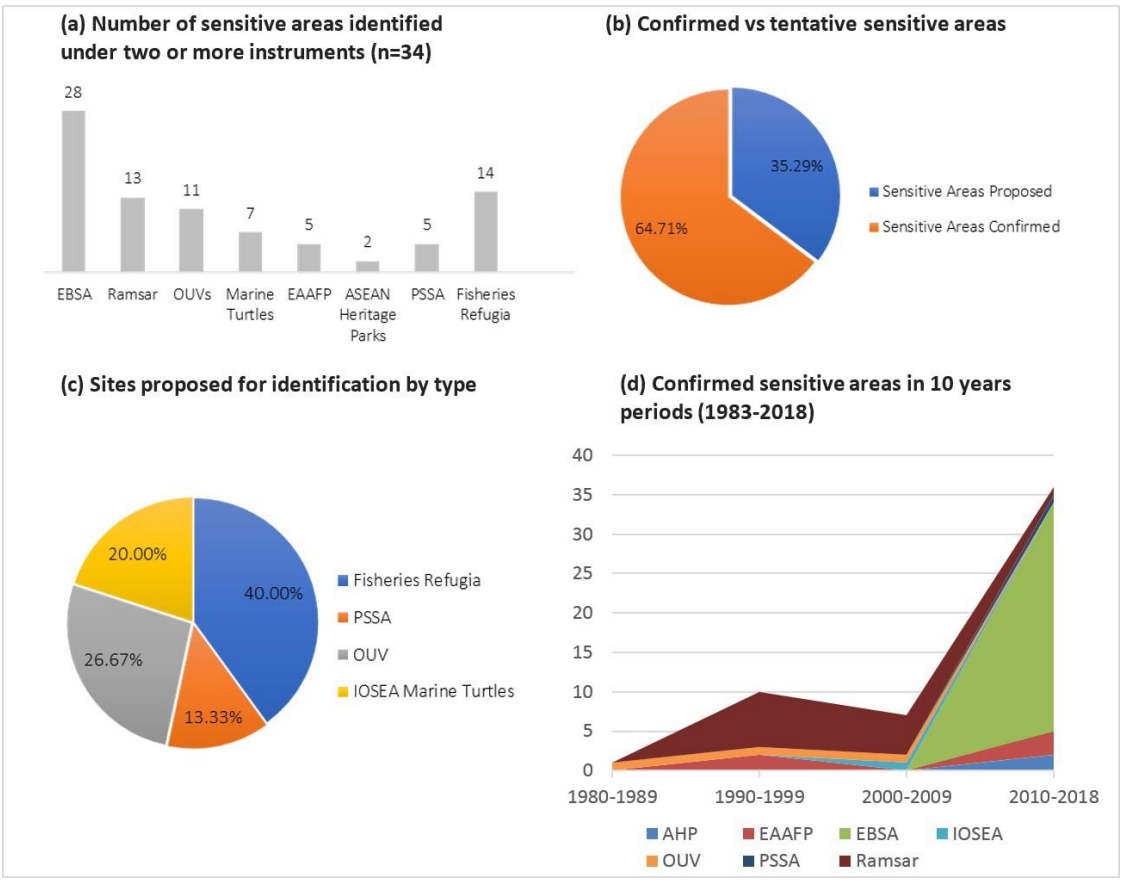

Figure 4.5: (a) Sensitive areas subject to two or more identifications under international instruments, (b) Tentative and confirmed identifications of sensitive areas, (c) Tentative identifications of sensitive areas subject to overlapping identifications by type, and (d) Confirmed sensitive areas by date.

[794] See Part 1 Chapter 1 Section 1.5.2 on ASEAN Heritage Parks, Part 1 Chapter 1 Section 1.2.4 on the listing procedure for Ramsar sites and Part 1 Chapter 2 Section on the EAAFP 1.4.2 on the EAAFP

[795] See Part 1 Chapter 1 Section 1.1.5

Nevertheless, to address the research question relating to practice of states in the identification of sensitive marine areas, , including the potential concordance of these practices, sensitive areas proposed by states have been included in the dataset of sensitive areas in Southeast Asia that has been captured for this study.

Another useful element of the identifications, to compare and understand the trends in identifications by states, is the date of identifications (and proposals) over time. The very first identification was made in 1983 for the Tubbataha Reef Marine Park, which was designated as an OUV.[796] No other sensitive area was designated until 1991 when a more regular flow of identifications started. (Figures 4.5 (d) above and 4.6 below)

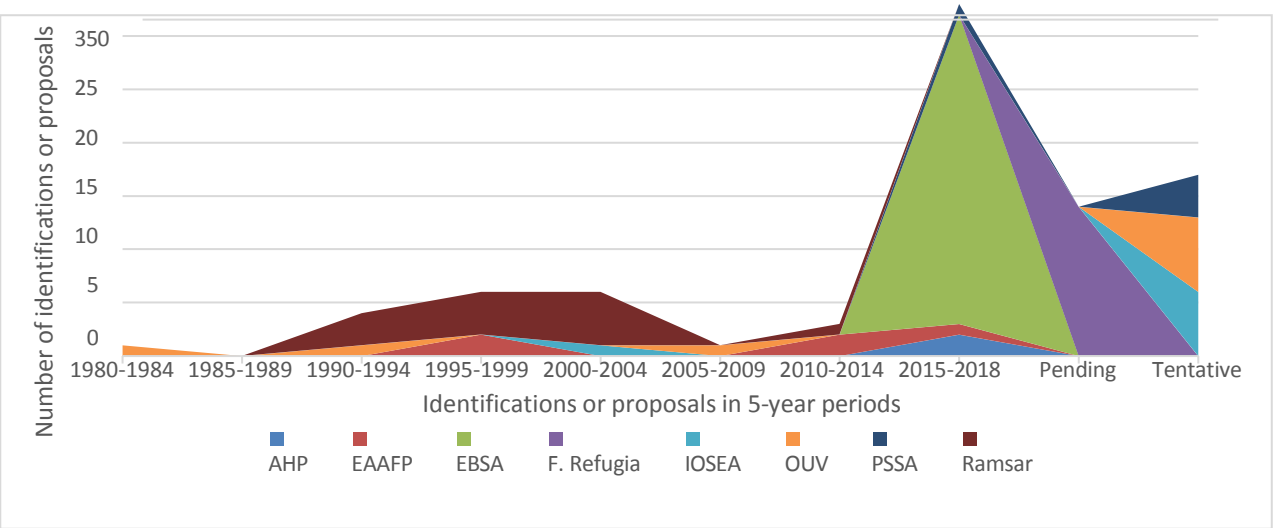

Figure 4.6: Sensitive areas identified or proposed in periods of 5 years (Pending proposals are Fisheries Refugia and Tentative proposals, including those made by states but unconfirmed under respective institutional processes)[797]

The 90s see a few identifications under Ramsar, OUV, EAAFP, with Ramsar being the dominant instrument used in the region. Elements that may explain this progressive evolution of a few sites identified per year include:

(i) the time needed to gather the data to meet the criteria, as required by the forms to make a proposal;

(ii) the domestic process to make the proposal at national level;

(iii) consultation with the intergovernmental body and fulfilment of the procedural steps involved under different instruments;

[796] Appendix G Table G3, supra note 774. This was based on the very exceptional features of this area as required at the time by the criteria. See Part 1 Chapter 1 Sections 1.3.1 and 1.3.3

[797] See supra Part 1 Chapter 2 Section 2.2.3

(iv) the time between meetings of intergovernmental bodies involved, such as COPs which often meet every two or three years only;

(v) the late adoption of some instruments by littoral states in the SCS.[798]

Overall, the spread of different identifications of sensitive areas over the years by different littoral states in the SCS demonstrates a balanced practice by these states, as shown by Figure 4.7 (a), where all or most of the states are visible, for each type of sensitive area.

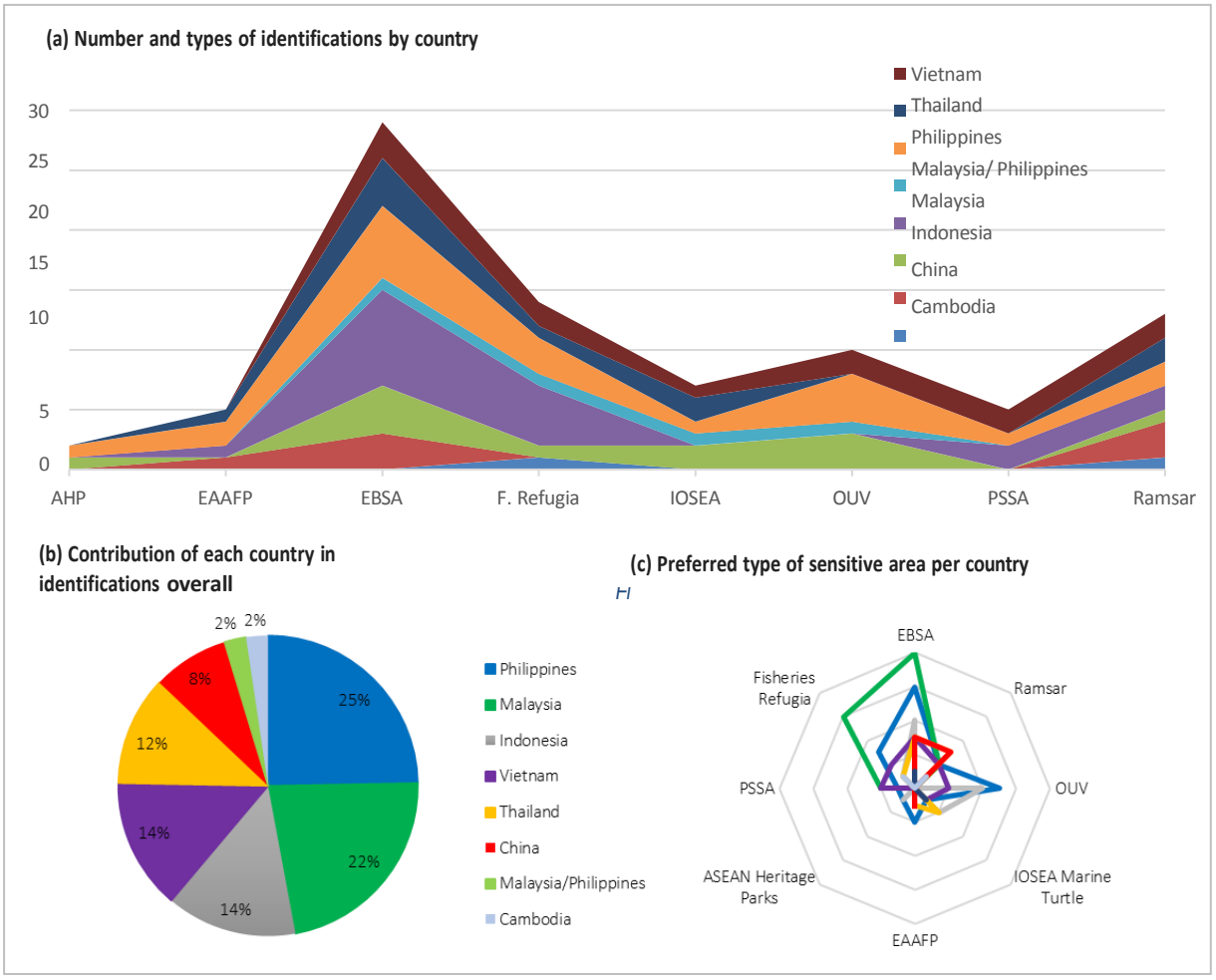

Figure 4.7: Sites subject to overlapping types of sensitive areas by country and identification type: (a) Number and types of identification by country, (b) Contribution of each country in identifications, and (c) Preferred type of sensitive area per country

These identifications also demonstrate wide use and thus general acceptance of the sensitive area criteria adopted under different instruments, by all the states bordering the SCS except Brunei and Singapore. Figure 4.7 (a) demonstrates the balanced use of the different types of sensitive areas

[798] For example: CBD COP meets every two years, Ramsar COP meets every three years, the meeting of the signatories to the IOSEA MOU has had long periods without meetings until a few years ago, etc.

(and thus also of the corresponding criteria) by states in all the confirmed and proposed identifications. Figure 4.7 (b) shows the respective identifications by all states, with Cambodia constituting the smaller share of 2%. Cambodia is also not a party to UNCLOS. (Table 4.1 below) However, Cambodia designated a coastal Ramsar site in 1999 and identified several Fisheries Refugia areas, therefore demonstrating also its participation in the process. China has the second smallest share in Southeast Asia. This may be explained by two main elements. First a large part of China is outside the geographic scope of this study. Second, China is also not a member of three of the regional processes. (Table 4.1)

Figures 4.7 (a) and (c) complement each other and both show that all states use most instruments. However, the latter figure provides also a more precise view of the instruments used by different states. The legal significance and possible implications in relation to state practice and acceptance of the criteria are examined in Chapter 6.

Table 4.1: Adoption of relevant source instruments by the states responsible for the identification of sensitive areas in Southeast Asia - Green indicates formal adoption – Red no formal adoption.

	Brunei Darussalam	Cambodia	China	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
EBSA									
Ramsar									
OUV									
IOSEA Marine Turtle			Not a member						
EAAFP Flyway									
ASEAN Heritage Parks			Not a member						
PSSAs / IMO Member States									
Fisheries Refugia / SEAFDEC-ASEAN Guidelines			Not a member						
UNCLOS									

The high number of recent and pending[799] identifications also demonstrates the engagement of states with legal and institutional processes to identify sensitive areas, as well as the topical and relevant nature of these processes. (Figure 4.6)

[799] 'Pending' identifications are Fisheries Refugia (supra note 798) and 'tentative' proposals include applications made by states that are awaiting and under consideration or are unconfirmed under respective institutional processes.

It also highlights that identification of sensitive areas is in progress in Southeast Asia and cautions against drawing hasty conclusions from current figures, as they may not be representative of on-going efforts.

The following section explores further the current use of the criteria in identifying different types of sensitive areas.

4.2 Investigation of overlapping identifications: convergence and divergence

Commonalities and differences between identification of sensitive areas under different instruments are further explored under two different approaches.[800] First, the frequency of associations of identification types is investigated: for instance, whether EBSAs are also frequently identified as Ramsar Sites OUVs. Second, the criteria applied for the different identifications and the data used to support the identifications are compared across sites. They are investigated from a state-practice perspective, looking at identified areas and the documents provided for their identification and/or those reported on the repository. The results are also considered in the assessment of convergence and divergence between the criteria included in the different sets of criteria reviewed. (Part 1 Chapter 3 Sections 3.1.12 and 3.2.2)

4.2.1 Associations of sensitive area types

To investigate associations between different types of sensitive areas, data on sensitive areas with overlapping identifications were compiled in a spreadsheet, and for each type of sensitive area, the presence or absence of other identifications and their type were investigated. The results are presented in the eight radar charts in Figure 4.8 below.

Each of the radar charts included in this figure relates to one of the eight types of sensitive area. Each charts identifies, for each type of sensitive area, whether sensitive areas identified under this type were also identified under other types, and if so which and how many.[801] Each chart indicates the total number of sensitive areas identified under the target type and the

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[800] Sets of criteria not included are those adopted for the identification of IMMAs, Special Areas under MARPOL, VMEs for fisheries beyond national jurisdiction, APEIs in the CCZ and those that may have been taken into account to avoid disposal of waste in these areas or in the implementation of other IMO conventions.

[801] For the names of these sites, see Appendix G Table G.2, supra note 774

number of confirmed or proposed identifications of the same areas under other types of sensitive areas, as follows:

- Of 28 EBSAs, 9 are also confirmed or proposed for identification as Ramsar sites, 9 as OUVs, 5 as IOSEA Marine Turtles Network Sites, 5 as EAAFP Flyway sites, 1 as an ASEAN Heritage Park, 5 as PSSAs, and 10 as Fisheries Refugia (Figure 4.8 (a));
- Of 13 Ramsar sites, in addition to the overlap mentioned above with EBSAs, 1 is also confirmed or proposed for identification as an OUV, 4 as IOSEA Marine Turtles Network Sites, 3 as EAAFP Flyway sites, 1 as an ASEAN Heritage Park, 3 as PSSAs, and 3 as Fisheries Refugia (Figure 4.8 (b));
- Of 11 OUVs, in addition to previously mentioned overlaps, 4 are also confirmed or proposed for identification as an IOSEA Marine Turtles Network Sites, 1 as an EAAFP Flyway site, 2 as ASEAN Heritage Parks, 3 as PSSAs, and 2 as Fisheries Refugia (Figure 4.8 (c));
- Of 7 IOSEA Marine Turtles Network Sites, in addition to previously mentioned overlaps, 1 is also confirmed or proposed for identification as a EAAFP Flyway site, 1 as an ASEAN Heritage Park, 1 as a PSSA, and 2 as Fisheries Refugia (Figure 4.8 (g));
- Of 5 EAAFP Flyway sites, in addition to previously mentioned overlaps, 1 is also confirmed as proposed for identification as an ASEAN Heritage Park, 1 as a PSSA, and none as Fisheries Refugia (Figure 4.8 (d));
- Of 2 ASEAN Heritage Parks, in addition to previously mentioned overlaps, 1 is also confirmed or proposed for identification as a PSSA, and none as Fisheries Refugia (Figure 4.8 (h));
- Of 5 PSSAs, all the other overlapping confirmed or proposed areas for identification are mentioned above (Figure 4.8 (e));
- Of the 14 proposed Fisheries Refugia, all overlapping confirmed or proposed identifications are mentioned above (Figure 4.8 (f)).

Several observations can be made. First, all the types of sensitive areas are associated with EBSAs. For each type of sensitive area with an overlapping identification, EBSA is the most frequently associated type. (see above) The smallest overlap is with the ASEAN Heritage Park. However, the current total of two ASEAN Heritage Parks is a particularly small sample

(the smallest of all the types of sensitive areas examined) and may not be representative.[802]

Figure 4.8: Associations between the different types of sensitive areas: (a) EBSA, (b) RAMSAR, (c) OUV, (d) EAAFP, (e) PSSAs, (f) Fisheries Refugia, (g) IOSEA Marine Turtles, and (h) ASEAN Heritage Parks.

The high correlation with EBSAs is consistent with the set of scientific criteria for identifying EBSAs being the most comprehensive. It shows that most of the scientific criteria for

[802] Since 2018, two new coastal and marine sites have been added, supra Part 1 Chapter 1 Section 1.5.1

identifying sensitive areas other than EBSAs are included in the EBSA set of criteria.[803] Also consistent with this is that, of the 28 EBSAs that are the subject of overlapping identifications, the most frequently associated identification is Fisheries Refugia, with 10 overlapping sensitive areas (out of 14 areas also identified under other instruments), followed by Ramsar Sites and areas of OUV with 9 overlapping areas. This illustrates again that EBSAs are the most diverse type of sensitive areas based on the most comprehensive set of criteria. Where all the sensitive areas of a given type are also EBSAs, one may ask whether these identifications are redundant. It is important to note that they are not, as each identification serves a different purpose regulated under the relevant legal instruments. This point is further discussed in Chapter 6.

A second group of observations relates to the types of sensitive areas between which there appears to be no association or correlation. The following associations were found to have no overlap in the 34 sensitive areas subject to overlapping identification in Southeast Asia:

- EAAFP site and Fisheries Refugia (Figure 4.8 (d) and (f);
- PSSA and Fisheries Refugia (Figure 4.8 (e) and (f));
- ASEAN Heritage and Fisheries Refugia (Figure 4.8 (h) and (f)).

With respect to EAAFP sites and Fisheries Refugia, this situation may be explained by Fisheries Refugia seeking to protect spawning and nursery grounds for commercial fish whereas the EAAFP seeks to identify critical habitats for migratory birds.[804] Although these two objectives are different and may explain the absence of overlap, an overlap would be possible for an area which sustains both migratory birds and commercial fisheries, provided that the area has not been declared a no-take zone.

Criteria for PSSAs do include those of Fisheries Refugia. However, to designate an area as a PSSA, an additional condition relates to the nature of the commercial shipping traffic and its impact on the characteristics of the area that the PSSA seeks to identify and protect.[805] The effects of shipping on seabed areas that may be important as nursery and spawning grounds do

[803] This is consistent with the analysis provided in Part 1 Chapter 3 Section 3.1

[804] On scientific criteria for the identification of EAAFP sites see Part 1 Chapter 1 Section 1.4.2. On the identification of Fisheries Refugia, see Part 2 Chapter 4 Section 4.1.1

[805] On the identification of PSSAs and the scientific criteria, see Part 1 Chapter 2 Section 2.1.2

not appear to have been so far presented to the IMO to justify adopting a PSSA in Southeast Asia.[806]

Finally, concerning ASEAN Heritage Parks and Fisheries Refugia, the current absence of an overlap may not be permanent. It may rather reflect the recent developments of Fisheries Refugia in Southeast Asia and that they are still at an early stage.[807] There are also few coastal and marine ASEAN Heritage Parks.[808] Furthermore, they are identified on the basis of a narrow set of conditions linked to the presence of spawning and nursery grounds for commercially important fish in the region. Nevertheless, the criteria for identifying ASEAN Heritage Parks could encompass these conditions.[809]

4.2.2 Comparison of criteria used overall to support identifications under different types of sensitive areas

4.2.2.1 Methodology

This comparative analysis is divided into two main investigations. First, an analysis based on Table 3.1 and Table 3.2 of Part 1 on correspondences between ecological and non- ecological criteria developed to identify sensitive marine areas in different families of legal instruments aiming to protect and conserve the marine environment. These are limited to the instruments/types of sensitive areas identified in Southeast Asia and grouped into a single table of all criteria (ecological and non-ecological).

[806] None of the PSSA applications in Southeast Asia emphasises Fisheries Refugia; see Appendix G Table G.3 supra note 774. However, measures such as no-anchoring areas adopted for PSSAs located in other parts of the world are designed to protect the integrity of the seabed habitat, supra Part 1 Chapter 2 Section 2.1.2.3

[807] See Part 1 Chapter 2 Section 2.2.3

[808] See Part 1 Chapter 1 Section 1.5.2

[809] Conditions for Fisheries Refugia could qualify under economic criteria (criterion 2.1, importance for economic species and criterion 2.3, direct and indirect economic benefits) and under ecological criteria (criterion 3.3, dependency or criterion 3.7, productivity)

Table 4.2: Ecological and Non-ecological Criteria in the Types of Sensitive Areas Identified in Southeast Asia

Sensitive Area Type	# in SEA	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
EBSA	14	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0
Ramsar	10	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0
OUV	3	1	1	1	1	0	1	1	1	0	1	0	0	0	1	1	1	1
IOSEA Marine Turtles	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EAAFP Flyway	5	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0
ASEAN Heritage Parks	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	0	1
PSSA	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
Fisheries	2	0	1	0	1	1	1	1	0	1	1	1	1	0	0	0	1	0
Total	36	94%	100%	94%	100%	92%	100%	100%	94%	44%	61%	75%	8%	6%	14%	14%	17%	11%

Legend:

A = Uniqueness
B = Life History
C = Endangered
D = Vulnerability
E = Productivity
F = Biodiversity
G = Naturalness
H = Representativity
I = Connectivity
J = Refugia
K = Economic value
L = Social Value
M = Educational Value
N = Cultural or Traditional Use
O = Cultural, Religious, Spiritual Significance
P = Scientific Research
Q = Other Considerations (legal and political)

Table 4.3: Ecological and Non-ecological Criteria Relied on in the Identification of Sensitive Areas in Southeast Asia

Sensitive Area Name (SEA)	Multi-designation	Date	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Hainan Dongzhaigang Mangrove National Natural Reserve	EBSA	2016	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Hainan Dongzhaigang Mangrove National Natural Reserve	Ramsar	1997	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0
Shankou Mangrove National Nature Reserve	EBSA	2016	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Shankou Mangrove National Nature Reserve	Ramsar	2002	1	1	1	0	0	1	1	1	0	0	1	1	1	0	0	1	1
Xuan Thuy	EBSA	2016	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1
Xuan Thuy	Ramsar	1992	1	1	1	1	1	1	1	0	1	0	1	1	1	0	0	1	0
Mai Po Nature Reserve	EBSA	2016	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Mai Po Nature Reserve	Ramsar	1995	1	1	1	1	0	0	1	0	0	0	1	1	1	1	0	1	0
Mai Po Nature Reserve	EAAPF	1996	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bako Buntal Bay	EBSA	2016	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	1
Bako Buntal Bay	EAAFP	2013	0	1	1	1	0	0	0	0	1	0	1	0	1	0	0	0	1
Don Hoi Lot	EBSA	2016	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0
Don Hoi Lot	Ramsar	2001	1	0	1	1	1	1	0	0	0	0	1	1	1	1	0	1	0
Ha Long Bay	EBSA	2016	1	1	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0
Ha Long Bay	OUV	1994	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Khok Kham	EBSA	2016	0	1	1	1	1	1	0	0	1	0	1	1	0	0	0	0	0
Khok Kham	EAAFP	2014	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0
Mu Koh Ang Thong Marine Ntl Park	Ramsar	2002	0	0	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0
Mu Koh Ang Thong Marine Ntl Park	Fisheries	2008	0	1	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0
Pulau Kukup	EBSA	2016	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0

Sensitive Area Name (SEA)	Multi-designation	Date	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Pulau Kukup	Ramsar	2003	1	0	1	1	0	1	0	0	0	0	1	0	1	0	0	1	0
Tanjong Piai	EBSA	2016	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0
Tanjong Piai	Ramsar	2003	0	1	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0
Olango Island Bird Sanctuary	EBSA	2016	1	1	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1
Olango Island Bird Sanctuary	Ramsar	1994	1	1	1	1	1	1	0	0	1	0	1	1	0	0	0	1	0
Olango Island Bird Sanctuary	EAAFP	1996	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	1	0
Busuanga - Calamianes/Coron Island	EBSA	2016	1	1	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1
Busuanga-Calamianes	Fisheries	2008	0	1	0	1	1	0	0	0	1	0	1	0	0	0	0	1	0
Tubbataha Reef Marine Park	EBSA	2016	1	1	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1
Tubbataha Reef Marine Park	Ramsar	1999	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	1	1
Tubbataha Reef Marine Park	OUV	1983	1	1	1	0	0	1	1	0	1	0	1	0	1	0	0	1	1
Tubbataha Reef Marine Park	EAAFP	2015	1	1	1	0	1	1	1	0	1	0	0	1	1	0	0	1	1
Tubbataha Reef Marine Park	ASEAN	2015	1	1	1	1	0	1	0	1	0	1	0	0	1	0	0	0	1
Tubbataha Reef Marine Park	PSSA	2017	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1
Ujung Kulon National Park	EBSA	2016	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	1	0
Ujung Kulon National Park	OUV	1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total			26	30	31	29	26	28	18	3	18	4	21	17	17	5	0	17	13
			72%	83%	86%	81%	72%	78%	50%	8%	50%	11%	58%	47%	47%	14%	0%	47%	36%

For each site,

- Criteria of the Reference Criteria Set considered to be found in each set of criteria studied are marked in green and given the value '1';
- Criteria considered to not be found are marked in red and given the value '0';
- Criteria considered to be implied in the different sets of criteria are marked in light green and given the value 1 (Table 4.2 below).

To compare the results of this 'theoretical' analysis of criteria with the application of these criteria to the sites identified by states in Southeast Asia, the sites that are subject of overlapping identification were compiled in a separate excel table. For each site, the criteria used to justify the identification of the site under different instruments were investigated. (Appendix G Table G.3)[810]

Due to the frequent lack of information for sites proposed as sensitive areas but not yet confirmed, tentative and pending identifications were removed from the compilation. For each site and under each type of identification, criteria described as being met are marked in green and given the value '1'. Those which were not met, described, or alluded to, are marked in red and given the value '0'. (Table 4.3 below) To compare the criteria used to identify sensitive marine areas, the findings in Table 4.2 were calibrated to the number of sites (and their respective types) found in Table 4.3.

4.2.2.2 Results

The results are presented in Figure 4.9 below and show a noticeable difference between the theoretical analysis of shared criteria and their actual use to identify sensitive areas under different instruments. They also show overall consistency for the most commonly used criteria.

The most commonly used criteria in practice are the following five: 1) uniqueness, 2) life history, 3) endangered species and ecosystems, 4) vulnerability and 5) biodiversity (Figure 4.9a). It was expected that these criteria are among those most used across all types of sensitive areas (Figure 4.9b). However, two main types of differences are observed; first with respect to criteria that are less used than expected; and second, with respect to those

[810] Supra note 774

that are more used than expected.

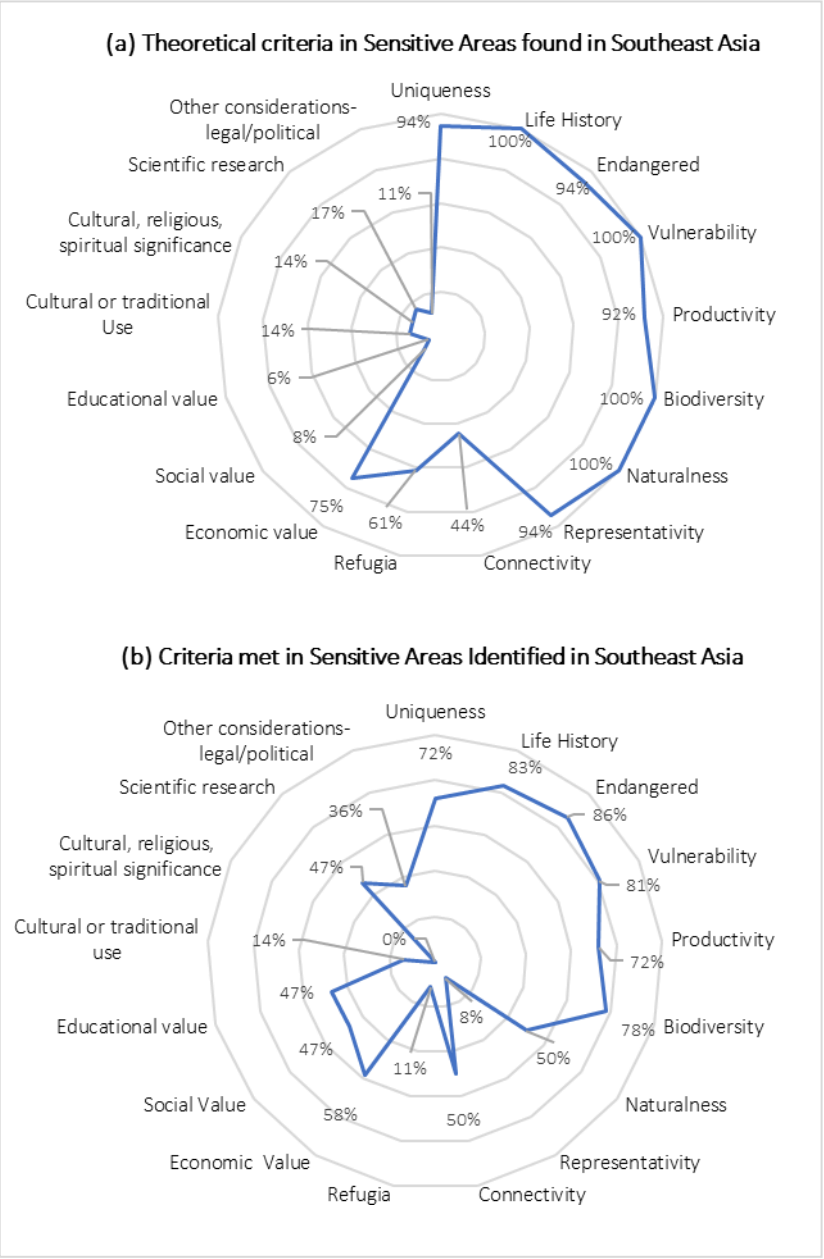

Figure 4.9: (a) Theoretical Criteria and (b) Actual criteria met in Sensitive Areas found in Southeast Asia

Given that most criteria are alternative criteria for the identification of sensitive areas and that the theoretical projection in Figure 4.9b was based on all criteria of the relevant sets of criteria being used in the identification –as if they were cumulative criteria-, it was expected that the criteria used would be a few points below the expectation.

However, criteria that are much less used than expected are naturalness and integrity (50% instead of 100%), representativity (8% instead of 94%) and refugia (11% instead of 61%). Several explanations can be proposed. With respect to naturalness and integrity, it may

reflect the intensive use of marine and coastal ecosystems in Southeast Asia.[811] Furthermore, the frequent use of the criterion of naturalness was observed by Bax et al (2015) as being negatively correlated with productivity, a consistent finding with this explanation.[812] By contrast, the lack of use of the criterion of refugia may reflect a general lack of data on climate-change effects on marine systems, both globally[813] and in Southeast Asia (except perhaps for coral reefs).[814] Region-wide data may be lacking to characterise the representativity of an area and/or it may be not be perceived as important by the states concerned, which appear to focus on (non-ecological) socio-economic criteria, in addition to the five ecological criteria highlighted above.

Criteria that were used noticeably more than expected are mostly non-ecological criteria; these criteria are referred to, even where they are not necessary criteria for the identification of an area. In addition to the economic value which was used consistently with the prediction, social value and educational value (47% used compared to 8% and 6% expected, respectively) were highlighted more than expected. Social and educational values are express criteria for IOSEA Marine Turtle Sites Network and PSSAs only. Educational value is also a criterion for ASEAN Heritage Parks. However, the Ramsar Sites' information sheet generally mentions social and educational benefits.[815] Social value includes monetary value, such as recreation and tourism, as well as non-monetary value, such as the respect for nature and aesthetic value. Education programs for local populations or in schools are also valued. Several reports of EAAFP sites also mention social and educational value.[816] Even some EBSA forms mention social

[811] Intensive and competitive human activities in the South China Sea is not a new topic and it has generated a plethora of articles. See for example UNEP/COBSEA (2009) supra note 21 and infra note 874

[812] NJ Bax et al (2015) supra note 186. See also Part 1, Chapter 3, Section 3.1.1

[813] D Johnson et al (2018) Climate Change is likely to severely limit the effectiveness of deep-sea ABMTs in the North Atlantic, Marine Policy 87: 111-122. See also Part 1 Chapter 3 Section 3.1.1

[814] For example ASEAN State of Climate Change Report (ASCCR) Jakarta, ASEAN Secretariat, October 2021 [62]. Available https://asean.org/wp-content/uploads/2021/10/ASCCR-e-publication-Final-12-Oct-2021.pdf; accessed 20 Mar 2022. See also L Pendleton (2020) Opinion: We Need a Global Movement to Transform Ocean Science for a Better World, PNAS 117: 9652-9655. Available https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7211938/; accessed 20 Mar 2022. This article highlights the data gap in the South China Sea.

[815] For example, Shangou Mangrove National Nature Reserve in China, Xuan Thuy in Vietnam, Pulau Perhentian in Malaysia and Ko Kra Archipelago in Thailand

[816] For example, Bako Buntal Bay in Sarawak, Malaysia for educational value and Tubbataha Reef in Philippines for social and educational value

And educational value, although it is not an EBSA criterion.[817]

The two following explanations can be envisaged. First, in Southeast Asia, states emphasize economic development and tend to place conservation in that context through sustainable development.[818] Therefore, the social and economic values of sensitive areas may be particularly important to justify following their identification by effective management measures. Second, identifications as Ramsar Sites and areas of OUV are among the earliest identifications and they require particularly comprehensive studies for their identification. The re-use of these studies for identification under other instruments can also lead to the overemphasizing of some characteristics of a site that may not be strictly necessary under another set of criteria. An example is the study of Tubbataha Reef, first as an area of OUV in 1983 (and later updates) and subsequently as a Ramsar Site in 1999. Later identifications built on these earlier reports.[819] Comparisons of criteria used for different types of sensitive areas in the same location are further discussed below.

4.2.3 Consistency and inconsistencies between criteria used for different types of sensitive areas in the same location

The compilation of criteria used to identify the sensitive areas that are the subject of overlapping identifications showed general consistency across types of sensitive areas in the same location. However, some inconsistencies are noteworthy and suggest possible gaps in coordination between different types of sensitive areas that may be managed by different authorities or experts. Several examples of information contained in Ramsar description sheets seem at odds with the information used to support the EBSA identification. For example, with respect to the Hainan Dongzhaigang Mangrove National Natural Reserve, the EBSA is based on

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[817] For example, Ha Long Bay in Vietnam

[818] The ASEAN-China Strategy on Environmental Cooperation 2016-2020 puts forward the promotion of 'the sustainable use of coastal and marine environment' as one of the 11 priority areas of cooperation. It frames conservation as a means for development and economic benefits, [para. 6 and 10(g)]. Available http://environment.asean.org/wp-content/uploads/2017/02/ASEAN-China-Strategy-on-Environmental-Cooperation-2016-2020.pdf; accessed 3 March 2022

[819] UNESCO reports available at https://whc.unesco.org/en/list/653/ and https://whc.unesco.org/uploads/nominations/653bis.pdf; accessed 3 March 2022. Ramsar identification sheet available at https://rsis.ramsar.org/RISapp/files/RISrep/PH1010RIS.pdf; accessed 3 March 2022

a high rating of endangered species, whereas the Ramsar website does not mention any.[820] Similarly, concerning the Shankou Mangrove National Nature Reserve, information relating to the EBSA identification indicates no data on the life history of species, whereas information on to the identification as a Ramsar Site indicates that the area hosts migratory birds. A few areas which, under the EBSA identification process, are assessed as having medium or low productivity are identified as confirmed for tentative fisheries refugia and thus considered to comprise regionally important spawning and nursery grounds for commercial fisheries and are therefore classified as productive.[821]

To avoid such inconsistencies, it is proposed that publication through a centralised repository of the reports corresponding to the identification of each sensitive area, and of the underlying data could help make a better use of the studies and optimise the use of research grants for the management of the marine environment in Southeast Asia.

4.2.4 Geographical coverage

Although the number of 94 sensitive areas identified in Southeast Asia under international instruments may appear significant, their location in Map 4.1 above shows that they are generally coastal and small, especially in the SCS. This situation is suspected to reflect the desire of the littoral states to avoid disputed areas.

By contrast, states that border the Sulu-Sulawesi seas have identified sensitive areas of regional, if not global significance, such as the Turtle Islands which include nine islands off Borneo under the control of Malaysia and the Philippines. Although all the other sensitive areas were designated under a domestic process,[822] two overlapping and on-going regional and inter-governmental initiatives that include the development of a MPA system or network must be mentioned: The Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security

[820] Appendix G Table G.3, supra note 774

[821] Ibid

[822] Domestic identifications of MPAs in Southeast Asia are often criticized for being empirical and opportunistic rather than based on scientific and ecological data. This is highlighted in the Status of Coral Triangle Countries National MPA Programs. CTI-CFF, CTMPAS Framework and Action Plan, CTI-CFF, UNSAID, Coral Triangle Support Partnership and US NOAA, Cebu City, Philippines, 2013, [21-24,]. Available http://www.coraltriangleinitiative.org/sites/default/files/resources/CTI-CFF%20Regional%20Plan%20Of%20Action%20(RPOA)%20.pdf; accessed 3 March 2022

(CTI-CFF)[823] and the Sulu-Sulawesi Marine Ecoregion (SSME).[824]

Goal 1 of the Commitments to Action of the 2009 CTI-CFF Regional Action Plan focuses on the identification, designation and effective management of 'Priority Seascapes'. Goal 3 is to establish MPAs and have them effectively managed through a region-wide Coral Triangle MPA System (CTMPAS).[825] This includes the prioritisation of individual MPAs and networks of MPAs designated under different international and regional instruments and domestic schemes, including World Heritage sites, ASEAN Heritage sites and Ramsar Sites.[826] Guiding Principle 5 also highlights the importance for measures taken to implement the CTI-CFF to comply with relevant legal instruments and multilateral processes, including those under UNCLOS, CBD, CITES, the SSME and ASEAN.[827] These goals do not include independent ecological or non-ecological criteria for identification in the context of the CTI-CFF. Instead, they rely on criteria

[823] At governmental level, the Coral Triangle Initiative broadly designates the commitment of six governments in the Coral Triangle (Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands and Timor-Leste) to engage in cooperative action to address threats to coral reefs, fisheries and food security. The initial commitment was the Leaders Declaration on Coral Reefs, Fisheries and Food Security of 15 May 2009 in Manado. Available http://www.coraltriangleinitiative.org/sites/default/files/resources/Leader%20Declaration%20coral%20triangle%20initiative_0.pdf; 3 March 2022. It is generally referred to as CTI-CFF. For further details of the meetings which preceded this declaration, see the summary of the CTI Secretariat at https://www.thegef.org/news/coral-triangle-initiative-coral-reefs-cti-fisheries-and-food-security; accessed 3 March 2022. The CTI-CFF also relies on non-governmental partners (especially International Organisations (IOs) and Non-Governmental Organisations (NGOs) for funding, technical expertise and as implementing agencies especially the GEF, the Asian Development Bank (ADB), The Food and Drug Administration (FAO), The Nature Conservancy (TNC), and WWF. Available https://www.thegef.org/news/coral-triangle-initiative-coral-reefs-cti-fisheries-and-food-security; accessed 3 March 2022

[824] Prior to the development of the CTI-CFF, three of the CTI governments (Indonesia, Malaysia and Philippines) entered into a Memorandum of Understanding on 13 February 2004 to ensure effective protection and sustainable development of the Sulu-Sulawesi Marine Eco-region (SSME MOU). Its objectives include the establishment 'of management strategies and coordinated institutions for effective ecoregional conservation' and of a 'functional integrated network of priority conservation areas to ensure ecological integrity'; the conclusion of this 2004 SSME MOU, which is presented as a highlight of CBD COP7, led to the creation of the Tri-National Committee for the SSME and subsequently, in 2006, to the creation of three Sub-Committees on (1) Threatened, Charismatic and Migratory Species; (2) Sustainable Fisheries; and, (3) Marine Protected Areas (MPAs) and Networks. On the non-governmental origin of the SSME MOU, see EFB Miclat et al (2006) Planning across boundaries for the conservation of the Sulu-Sulawesi Marine Ecoregion, Ocean and Coastal Management 49: 597-609. The CTI-CFF and the SSME MOU are independent of one another although they share some members, partners, data and sometime refer to one another. Meetings are also held separately. However, work under the SSME MOU is seen as a contribution towards the targets of the CTI-CFF for the SSME, a priority seascape of the CTI. See Action Plan of the Sub-Committee on Marine Protected Areas and Networks of the Sulu-Sulawesi Marine Ecoregion, 2009, Sub-Committee on the Sulu-Sulawesi Marine Ecoregion, Manila, Philippines; and Action Plan of the Sub-Committee on Threatened, Charismatic and Migratory Species of the Sulu-Sulawesi Marine Ecoregion, 2009, Sub-Committee on the Sulu-Sulawesi Marine Ecoregion, Manila, Philippines. Available https://www.adb.org/sites/default/files/publication/29160/ssme-action-plans.pdf; accessed 3 March 2022

[825] The Regional Plan of Action was adopted in March 2009 by the CTI-CTF Third Senior Officials' Meeting in Port Moresby, ibid

[826] Ibid [31]

[827] Ibid [8]

developed under relevant institutions such as those examined in Part 1 of this study.

However, the language of criterion 3 relating to sites that are important for threatened, endangered or declining species and habitats can be found in part in Goal 5 focused on improving the status of threatened species. This goal and criterion 3 carry particular legal significance as they directly implement the language of Article 194(5) of UNCLOS.[828] Annotations under this goal refer to the populations of sharks, sea turtles, marine mammals, corals, seagrass, mangrove and other identified species on the IUCN Red List and CITES Appendices.[829] Reference is also made to the management of the habitat needs for all life-cycle stages of highly migratory species and the completion and implementation of a region-wide Shark Conservation Action Plan and a Marine Mammals Conservation Action Plan.[830] The methodology set out for the development of the CTMPAS relies on existing MPAs and gap analysis to complete the MPA network with missing elements.[831] It envisages four categories of MPAs within the CTMPAS; the first two require admission at regional level whereas the other two remain under country-level review:[832]

- category 4: Flagship Regional Sites – sites of exceptional regional importance in terms of ecology, socioeconomics and governance;
- category 3: Priority Development Sites – sites identified as having high regional importance in terms of ecology, socioeconomics and governance;
- category 2: Effectively Managed Regional Sites – sites recognized as contributing towards CTMPAS objectives at national or regional levels; [833]
- category 1: Recognized CTMPAS Sites – sites that contribute towards CTMPAS objectives at local scales.

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[828] See Part 2 Chapter 6 for the legal discussion on the application of this criterion

[829] See Part I Chapter 3 Section 3.1.4. See also Section 3.1.5 on C4

[830] CTI-CFF Regional Plan of Action [41-45], supra note 825

[831] CTMPAS Framework and Action Plan, Strategies for Developing and Operating MPAS [31-33], supra note 825

[832] Ibid [40-44]

[833] For this category of MPAs, the CTMPAS Framework and Action Plan sets out 14 general design criteria and five ecological criteria. The ecological criteria are representation, replication, resilience, connectivity and critical areas. The general design criteria include: sites must be part of a network and of an identified regional priority area, habitat or species, governance considerations, resource and socio-economic considerations, and research and development, ibid [44]. However, no comparable criteria are set out for other categories of MPAs within the CTMPAS.

Thirteen MPAs have been nominated by six states of the CTI to the CTMPAS, four in Papua New Guinea and the Solomon Islands.[834] Of the remaining nine, five are already identified under two or more international or regional instruments:

- Wakatobi National Park, Indonesia;
- Tun Mustapha Park, Malaysia;
- Turtle Islands Park, Malaysia and contiguous Turtle Islands Wildlife Sanctuary, Philippines;
- Tubbataha Reef National Park, Philippines.[835]

The Action Plan of the SSME Sub-Committees on Marine Protected Area and Networks and on Threatened, Charismatic and Migratory Species 2009-2012 (Sub-Committee on MPAs and Sub-Committee on Threatened and Migratory Species, respectively)[836] aim to *inter alia*

> establish a functional integrated network of priority conservation areas to ensure ecological integrity [and to]
>
> implement coordinated protection of threatened marine species to ensure maintenance of viable populations and protection of critical habitats.

The Action Plan of the Sub-Committee on MPAs further highlights the need to 'revisit, update and improve the Framework of Establishing MPAs in the SSME' and to coordinate research studies on MPAs, including connectivity-related research, such as those on critical habitats.[837] The Action Plan of the Sub-Committee on Threatened and Migratory Species also addresses the identification and protection of critical habitats with a particular focus on marine turtles, napoleon wrasse, marine mammals and sharks.[838]

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[834] List of 13 MPAs nominated is available at http://www.coraltriangleinitiative.org/news/13-mpas-nominated-coral-triangle- marine-protected-area-system; accessed 3 match 2022. They still need consideration for admission by the Advisory Committee within one of the four categories of MPAs of the CTMPAS.

[835] Those that are not the subject of overlapping identifications are Anambas Islands Marine Recreational Park, Pangumbahan Marine Turtle Park and Savu Sea National Marine Park in Indonesia, and Nino Konia Santana National Park in Timor Leste. The proposal of the Anambas Islands Marine Recreational Parks by Indonesia in this context is unexpected, as unlike the others that are all within the Coral Triangle boundaries, Anambas Islands are in the southern part of the SCS.

[836] The Work Plans of the SSME Sub-Committees were adopted in July 2009 at the 4th Meeting of the SSME Tri-National Committee in Batam, Indonesia.

[837] Action Plan of the Sub-Committee on MPAs, Strategy 1 and Activity 1.3, and Strategy 3 and Activities 3.1 to 3.3, supra note 825

[838] Action Plan of the Sub-Committee on Threatened and Migratory Species [6-14], supra note 825

This chapter examined the basis for the identification or designation of sensitive areas in Southeast Asia for marine and coastal areas that are the subject of such identification under different international and regional instruments. It investigated consistency, convergence and divergence through an analysis of the arguments provided to justify different identifications or designations. It also compared the practice in the SCS and in the Sulu Sulawesi.

Overall, the analysis shows a broad consistency and convergence between different identifications under different instruments. It also demonstrated a general consistency in the theoretical expectation for the use of criteria (based on the text of the respective sets of criteria) for five ecological criteria: 1) uniqueness, 2) life history, 3) endangered species and ecosystems, 4) vulnerability and 5) biodiversity. The analysis also highlighted some unexpected discrepancies, the most notable of which relates to non-ecological criteria.

Given the overall absence of identification of sensitive areas in the SCS beyond small coastal areas, Chapter 5 explores the application of the ecological criteria of the Reference Criteria Set to the SCS.

Chapter 5: Sensitive Areas in the SCS

This chapter further advances the investigation started in Chapter 4 on the potential or theoretical application of the Reference Criteria Set in the context of the SCS. The focus now turns to the availability of scientific data to fulfil the criteria despite a general lack of detailed marine environmental data for the SCS in global databases. For example, initiatives such as the Ocean Biogeographic Information System (OBIS) seek to compile and integrate global, regional and local datasets, as well as data held by research laboratories, programs and scientists, in a global database.[839] However, the SCS is still underrepresented in global datasets of marine ecological and biological data,[840] despite the recent 'discovery' that its hard coral biodiversity may be comparable to that of the Coral Triangle and the Great Barrier Reef of Australia.[841] Data and publications from past marine research cruises in the SCS and around the seamounts are generally not captured in public databases.[842]

This may be partly due to the absence of regional mechanisms, bodies or research centres with the capacity and the mandate to integrate, harmonise and record these data. The ASEAN Centre for Biodiversity Centre (ACB) may eventually be able to play this regional role.[843] However, data available on the public site are limited; national clearing-house managers are presented as primary providers. ACB's presentation of biodiversity data is also based on

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[839] OBIS was established in the early 2000s out of the Census of Marine Life programme, a scientific initiative. It was adopted in 2009 as a project under the International Oceanographic Commission (IOC)'s International Oceanographic Data and Information (IODE) programme. Several country nodes have been established in Member States of IOC-UNESCO (including China) to contribute to the datasets and the data-clearing mechanism. OBIS is a global open-access data and information clearinghouse on marine biodiversity for science, conservation and sustainable development. Available http://www.iobis.org/about/governance/; accessed 7 March 2022

[840] Data are scarce compared to other parts of the world and concentrated around the main coastlines. Example of global datasets with poor coverage of the SCS include the World Ocean Database 2009 on Plankton data and the Hexacorallians of the world. Datasets available in OBIS as 'Not associated with an OBIS Node' and 'Hexacorals', Hexacorallians of the world (OBIS), respectively. Baranova et al (2009) Plankton data. Chapter 16 in World Ocean Database 2009. S. Levitus (ed.), NOAA Atlas NESDIS 66, U.S. Gov. Printing Office, Washington D.C. [192-210]

[841] See Part 2 Chapter 5 Section 5.1.7 below on the biodiversity of the SCS hard corals. D Huang et al (2015) Extraordinary diversity of reef corals in the SCS, Marine Biodiversity, 45: 157-168.

[842] For example, the outcome of the Philippines-Vietnam Joint Oceanographic and Marine Scientific Research Expedition in the SCS (JOMSRE) as presented in the Proceedings of the Conference on the Results of the Philippines-Vietnam JOMSRE-SCS I to IV, 26-27 March 2008, Ha Long City, Vietnam

[843] The new web platform of the ACB and map visualisation of the ASEAN Clearing House Mechanism support this suggestion. Although it used to include primarily data provided by ASEAN Member States, it now also includes several global databases that are public databases, such as those managed by the United Nations, such as datasets of the World Database on Protected Areas (WDPA). See ASEAN Clearing House Mechanism. Available http://bim-mirror.aseanbiodiversity.org/dashboard/mapgallery.php; accessed 7 Mar 2022

states' biodiversity inventory, a terrestrial approach which makes it difficult to represent shared and moving resources and avoid duplication.[844] This approach can also leave out species, habitats and/or ecosystems in pockets of high seas and seabed which may be beyond national jurisdiction and would not be reported, despite their regional importance. For example, the Spratly seamounts are mostly excluded from the ACB website.[845] These datasets do not reflect the emerging abundant scientific literature on the SCS.

To test the application of the set of criteria developed in Part 1, this chapter focuses on the part of the SCS basin which is removed from the coastline of the littoral states, in particular the Spratly seamounts. This part of the SCS basin is particularly relevant from a regional and international law perspective because it involves a transboundary body of water which hosts straddling and migratory living resources and biodiversity, as well as cold seeps identified as an EBSA[846], and, as is demonstrated below, much scientific attention can be found from most of the SCS littoral states on the seamounts in the SCS.

The Spratly seamounts support oceanic reef formations in the deeper part of the SCS basin. This study proposes a regional approach to assess the significance of this area.[847] The Spratly seamounts form the transition between the Indochina, the Sundaic and the Philippines bioregions.[848] Scientists from and outside the region have studied their ecological significance since the early 90s, highlighting their likely importance to the coastal reefs of the SCS as a source of coral larvae and as a breeding ground for migratory and regional seabirds, as

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[844] ASEAN Centre for Biodiversity website. Available https://aseanbiodiversity.org/the-richness-of-biodiversity-in-the-asean-region/; accessed 7 Mar 2022

[845] Supra note 844

[846] Cold seeps located on the seafloor, 3000m deep, southwest of Taiwan and covering an area of 14,000km^2 have been identified as an EBSA by the Report of the Regional Workshop to Facilitate the Description of EBSAs in the Seas of East Asia, UNEP/CBD/EBSA/WS/2015/3/4* [39-42]. It was acknowledged (and therefore not objected to) by the following meeting of the COP to the CBD CBD/COP/DEC/XIII/12 [21].

[847] TJ Pitcher et al (ed.) (2007) Seamounts: ecology, fisheries & conservation. Fish and Aquatic Resources Series, 12. Blackwell Publishing, Oxford and MR Clark (2014) Identifying Ecologically or Biologically Significant Areas (EBSA): A Systematic Method and its Application to Seamounts in the South Pacific Ocean, Ocean and Coastal Management 91: 65-79

[848] DA Woodruff (2010) Biogeography and conservation in Southeast Asia: how 2.7 million years of repeated environmental fluctuations affect today's patterns and the future of the remaining refugial-phase biodiversity, Biodiversity Conservation 19: 919-941

well as sea turtles and commercially important fish species such as the skipjack tuna.[849] More recent studies highlight their biodiversity richness, especially for hard corals.[850]

5.1 Application of the Ecological Criteria from the Reference Criteria Set to the Seamounts in the SCS

5.1.1 Methodology[851]

In order to apply the criteria, a systematic review was carried out on the published scientific literature on the ecology of the SCS and on processes of physical oceanography.

Seamounts are the subject of numerous identifications as sensitive areas under two categories: EBSAs and VMEs. Independent scientists invited to a workshop on the identification of EBSAs on seamounts stated their findings in a 2011 IUCN Expert Report.[852] They discussed the application of each criterion to seamounts and highlight that criteria 1 and 3 (on uniqueness and importance for threatened and endangered species and/or habitats, respectively) are generally met by seamount habitats that possess some endemic species and are a system under threat. Other reports used as reference material are those concerning the 44 seamount

[849] CF Dai and TY Fan (1996) Coral fauna of Taiping Island (Itu Aba Island) in the Spratlys of the SCS. Atoll Research Bulletin, 436:1-21; The Fisheries Potential of the Kalayaan Island Group, SCS, in The Marine Biology of the SCS, B Morton (ed., Proceedings of the Third International Conference on the Marine Biology of the SCS, 28 October-1 November 1996, Hong Kong University Press, Hong Kong [219-226]; PM Aliño and MCC Quibilan (eds.) (2003) The Kalayaan Islands: Our Natural Heritage. University of the Philippines, Marine Science Institute. Quezon City; A Munprasit and P Prajakjitt (2000) Tuna Resource Exploration with Tuna Longline in the SCS, Area IV : Vietnamese Waters, Proceedings of the SEAFDEC Seminar on Fishery Resources in the SCS, Area IV : Vietnamese Waters. Available http://map.seafdec.org/downloads/pdf/collaborative%20research/AreaIV_Vietnam/SCS_FRS4_03.pdf; accessed 7 Mar 2022

[850] Huang et al (2015), supra note 842

[851] Much of this chapter was also contributed by the author to a joint article with Professor Chou Loke Ming. Y Lyons and LM Chou (2018) Do the Spratly seamounts and their coral reefs meet the scientific criteria for identifying Ecologically or Biologically Significant Areas. Available at SSRN: https://ssrn.com/abstract=3232743 or http://dx.doi.org/10.2139/ssrn.3232743; accessed 7 Mar 2022. This study only includes contributions from the author with full agreement of the co-author, also a supervisor for this study.

[852] Dunstan et al (2011) Identifying Ecologically and Biologically Significant Areas on Seamounts. Gland, Switzerland, IUCN. Available https://www.cbd.int/doc/meetings/mar/ebsa-ettp-01/other/ebsa-ettp-01-gobi-en.pdf; accessed 7 Mar 2022

and knoll areas identified as meeting EBSA criteria in most of the ocean basins (Appendix H).[853] EBSAs which contain seamounts but are not primarily centred on them were not considered in this review. When biological and ecological information is scarce, oceanographic data can be used as a basis to apply the criteria.[854] Considerations in refereed publications on seamount ecology were also taken into account in the application of the EBSA criteria.[855]

5.1.2 Uniqueness and rarity (C1)

Seamounts are presented as a typical example for this first criterion in Appendix II to CBD Decision IX/20, which adopted the EBSA criteria. The Spratly seamounts are spectacular geographic formations in the southern margin of the deep central basin of the SCS. They rise from depths of 3,000 m to 1,000 m into the photic zone. Some of them uncover at low tide, others are deeper than 20 m, not visible on high-resolution satellite imagery and sometimes unconfirmed on nautical charts, although they are mentioned on global seamount datasets and global seabed bathymetry datasets.[856]

It is suggested that these seamounts provide a unique network of steppingstones for vertical and horizontal connectivity.[857] Furthermore, a study of 16 near-shore and offshore reef areas in the SCS showed that they each have distinct coral species composition that are therefore at higher risk of

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[853] These were identified in the decisions of the COP to the CBD in 2012, 2014 and 2016: 17 seamount EBSAs acknowledged at CBD COP11, 26 at CBD COP12 and one at CBD COP13. 13 EBSAs in the western and South Pacific and four in the Wider Caribbean and Western Mid-Atlantic region, see CBD COP11 Decision XI/17. Available https://www.cbd.int/decision/cop/default.shtml?id=13178; accessed 7 Mar 2022. Six areas in the Southern Indian Ocean, three areas in the Eastern Tropical and Temperate Pacific, two areas in the North Pacific, 10 areas in the south eastern Atlantic, two areas in the Northwest Atlantic and three areas in the Mediterranean; see CBD COP12 Decision XII/22. Available https://www.cbd.int/decision/cop/default.shtml?id=13385; accessed 7 Mar 2022. CBD COP13 Decision XIII/12. Available https://www.cbd.int/doc/decisions/cop-13/cop-13-dec-12-en.pdf; accessed 7 Mar 2022. For Appendix H, supra note 774

[854] UNEP/CBD/EW-BCS&IMA/1/2* of 22 December 2009. CBD COP10 Decision X/29 para. 40 states that this report should be taken into account when applying the EBSA criteria.

[855] Pitcher et al (2007), supra note 847; AA Rowden (2010) Paradigms in seamount ecology: fact, fiction and future, Marine Ecology 31: 226-241; Clark (2014), supra note 847

[856] 2014 SRTM15 Topography grid made available by the Scripps Institution of Oceanography, University of California San Diego available at https://topex.ucsd.edu/sandwell/publications/180_Tozer_SRTM15+.pdf; accessed 7 Mar 2022. Where the summit of these seamounts is 20m deep or less and therefore visible on satellite imagery, they have been mapped and their surrounding bathymetry calculated. NUS Satellite Research Project on Insular Geographic Features in the SCS. Data available online https://cil.nus.edu.sg/south-china-sea-satellite-mapping-project/; accessed 7 Mar 2022

[857] On the importance of the SCS seamounts for evolution diversity, see D Huang et al (2016) Conservation of reef corals in the SCS based on species and evolutionary diversity, Biodiversity Conservation 25: 331-344

local extinction if destroyed.[858] The coral, *Leptoseris kalayaanensis*, is also likely endemic to the SCS and the Spratly Islands.[859]

5.1.3 Special importance for life history of species (C2)

The Spratly reefs play major roles in maintaining and replenishing regional biodiversity.[860] They provide rare shallow and suitable substrates for the recruitment of coral larvae brought by the currents generated by the meteorological and tidal circulation patterns.[861] Modelling simulations suggest that the Spratly reefs are a significant upstream source of genetic diversity for the Coral Triangle[862] because currents transporting larvae originate from there and extend to the central part of the SCS, the western shore of Luzon and Palawan, and further into the Philippine seas. The Spratly seamount area supplies larvae and young stages of fish and invertebrates to the SCS and replenishes species harvested from coastal, near-shore reefs.[863] Genetic affinities are present for some fish species[864] and reef invertebrates[865] between the Spratly area and the Philippines. The Spratly area is also an important source of larvae of the

[858] Huang et al (2015) supra note 842

[859] WY Licuanan and PM Aliño (2009) *Leptoseris kalayaanensis* (Scleractinia: Agariciidae), a new coral species from the Philippines. Raffles Bulletin of Zoology 57:1–4; and, BW Hoeksema et al (2010). The westernmost record of the coral *Leptoseris kalayaanensis* in the SCS. Zoological Studies 49:325. Z Waheed et al (2015) Scleractinian corals (Fungiidae, Agariciidae and Euphylliidae) of Pulau Layang-Layang, Spratly Islands, with a note on *Pavona maldivensis* (Gardiner 1995), ZooKeys 517: 1-37

[860] AC Alcala (2008) Summary of the marine biology results of JOMSRE-SCS I, III and IV and their management implications, Proceedings of the Conference on the Results of the Philippine-Vietnam Joint Oceanographic and Marine Scientific Research Expedition in the SCS (JOMSRE-SCS I to IV) [5-10]; VL Nguyen et al (2008) Status of Marine Biodiversity in the Northern Spratly Islands, SCS, In Proceedings of the Conference on the Results of the Philippines-Vietnam Joint Oceanic and Marine Scientific Research Expedition Research Expeditions in the South China sea (JOMSRE-SCS I to IV), Technical Cooperation Council of the Philippines, Oceanfriends Foundation, Inc, Dumaguete City, Philippines, [11-19]; JW McManus et al (2010) Toward Establishing a Spratly Islands International Marine Peace Park: Ecological Importance and Supportive Collaborative Activities with an Emphasis on the Role of Taiwan. Ocean Development & International Law 41:270–280

[861] PT Shaw PT and SY Chao (1994) Surface circulation in the SCS. Deep Sea Research Part 1. 41(11/12): 1663-1683. JG Dorman et al (2015) supra note 44

[862] JT Kool et al (2011) Connectivity and the development of population genetic structure in Indo-West Pacific coral reef communities. Global Ecology and Biogeography, 20(5): 695-706

[863] Dai and Fan (1996) supra note 850

[864] DG Ochavilli et al (2000) Identification of tropical coral reef fish larvae: MtDNA markers, morphometrics and multivariate analysis, Abstracts, 9th Int Coral Reef Symp, 23-27 Oct 2000, Bali, Indonesia [233]

[865] Aliño and Quibilan (2003) supra note 850

coral *Acropora millepora* for Philippine's Palawan reefs as well as SCS reefs.[866]

The Spratly reefs are also documented habitats of migratory species, especially of marine sea turtles and sea birds. The migrations of leatherback and green sea turtles are observed to pass through the Spratly seamount area.[867] Nesting and feeding grounds for green turtles (*Chelonia mydas*) and hawksbill turtles (*Eretmochelys imbricata*) are recorded around several reefs of the Spratly seamount areas[868] and tracks of tagged leatherbacks (*Dermochelys coriacea*) pass through the southern part of the Spratly seamount areas.[869] They are all CITES Appendix I species. Migratory birds, such as streaked shearwater (*Calonectris leucomelas*), brown booby (*Sula leucogaster*), great crested tern (*Sterna bergii*), lesser crested tern (*Sterna* bengalensis), white tern (*Gygis alba*), black-and-white sooty tern (*Sterna fuscata)*, black-naped tern (*Sterna sumatrana)* and brown noddy (*Anous stolidus)*, are observed using reefs in the Spratly seamount area as a rest stop and a breeding ground. The Spratly area provides a particularly important breeding ground for the crested tern: around 10% of the Asian population of this species is reported to be found on Swallow Reef. From July to October every year, more than 10,000 wintering individuals are seen to congregate on this reef to breed.[870]

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[866] Dorman et al (2015), supra note 44

[867] H Bailey et al (2012), Identification of distinct movement patterns in Pacific leatherback turtle populations influenced by ocean conditions, Ecological Applications, 22: 735-747. See also, for example, P Lushi et al (1996) Long-distance migration and homing after displacement in the green turtle (*Chelonia mydas*): a satellite tracking study, J Comp Physiol A 178: 447-452 and Protecting Marine Life

[868] K Ibrahim et al (2004) A Survey of Marine Turtles in Pulau Layang, Malaysia, Marine Biodiversity of Pulau Layang Malaysia, Department of Fisheries; Cheng, J. (1996) Sea Turtles at Taipin Tao, SCS, Marine Turtle Newsletter 75: 6-8. Available http://www.seaturtle.org/mtn/archives/mtn75/mtn75p6.shtml; accessed 7 Mar 2022

[869] SR Benson et al (2011) Large-scale movements and high-use areas of western Pacific leatherback turtles, *Dermochelys coriacea*, Ecosphere 2: 1-27 and RF Tapilatu et al (2013) Long-term decline of the western Pacific leatherback, Dermochelys coriacea: a globally important sea turtle population. Ecosphere 4:1-15. Available http://dx.doi.org/10.1890/ES12-00348.1; accessed 7 Mar 2022. See also J Ganong (2012) TOPP Summary of SSM-derived Telemetry based Census of Marine Life Tagging of Pacific Predators Dataset - Data on OBIS-SEAMAP

[870] Records of bird surveys are not clear on which of the crested tern species is the most abundant (great crested tern, *Sterna bergii* or lesser crested tern, *Sterna bengalensis*), unless one has been confused with the other, given their resemblance, which may have led to mistakes in identification. PM Aliño et al (eds.) (2002), Atlas of Philippine Coral Reefs, Philippine Coral Reef Information Network, Goodwill Trading Co Inc., Quezon City, Philippines [75-77]; BirdLife International (2022) Important Bird Areas factsheet: Pulau Layang-Layang. Downloaded from http://datazone.birdlife.org/site/factsheet/pulau-layang-layang--marine-iba-malaysia/text; accessed 7 Mar 2022; NS Haile (1964) Notes on birds on Spratly Island, Amboyna Bay and Swallow Reef, SCS. Sabah Society Journal 2: 135-137; M Gibby (1997) Sights, Sounds and Smells. Malayan Naturalist 51(1): 24-29; M Mat-Isa et al (1997) The birds on Pulau Layang-Layang, SCS, Malaysia, Journal of Wildlife Management & Research, Sabah 1: 26-30 and N Pilcher et al, Layang-Layang: A Drop in the Ocean, Natural History Publications (Borneo),Malaysia, 1999; McManus et al (2010), supra note 860

Finally, migratory routes of the Yellowfin Tuna (*Thunnus albacares*) pass eastwards through these seamounts from June to August and westwards from August to October.[871]

Several papers describe the establishment of Fisheries Refugia in the SCS for enhancing fisheries resources of the Southeast Asian Region,[872] in the regional initiative under the UNEP/GEF SCS Project (2002-2009),[873] where 'refugia' refers to critical habitats (e.g., critical spawning and nursery areas) for commercial fisheries resources. Although this project, which focuses on refugia for fisheries of small-scale coastal communities, does not apply to fisheries in the Spratly seamounts,[874] the methodology developed could be also applied to the central basin of the SCS.

The support to gene flow and migration among deep-sea and pelagic fauna that may be provided by insular seamounts has been found to contribute to meeting the EBSA criterion 3 on threatened and endangered species for several EBSA seamounts in different ocean basins. That seamounts in a regional sea may be a larval source for species that settle along the coast was taken into account for the application of criterion 2 on special importance for the life history of species to the Eastern Caribbean EBSA.[875]

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[871] JR Morgan and MJ Valencia (1983) Atlas for Marine Policy in Southeast Asian Seas. University of California Press, Berkeley

[872] S Siriraksophon (2014) Fisheries Refugia: A Regional Initiative to Improve the Integration of Fisheries and Habitat Management, J. Mar. Biol. Ass. India 56: 55-64 and CJ Paterson et al (2013) Fisheries Refugia: A Novel Approach to Integrating Fisheries and Habitat Management in the Context of Small-scale Fishing Pressure, Ocean and Coastal Management 85: 214-229

[873] On the UNEP/GEF project entitled 'Reversing Environmental Degradation Trends in the South China and Gulf of Thailand' (The UNEP/GEF SCS Project) which was implemented by UNEP in partnership with seven littoral States of the SCS, see Chapter 2 Section 2.2.3.1 above and note 543.

[874] The UNEP/GEF SCS Project does not include the insular features in the SCS. See Paterson and Yingyuad (2018), ibid and Chen's account of the framing of this project and agreement to keep disputed areas in the SCS outside the geographic scope. S Chen (2013) Environmental Cooperation in the SCS: Factors, Actors and Mechanisms, Ocean and Coastal Management 85: 131-140 [135-136]

[875] Eastern Caribbean EBSA information sheet on the Clearing-House Mechanism of the CBD Information Submission Service. Available https://chm.cbd.int/database/record?documentID=200097; accessed 7 Mar 2022

5.1.4 Importance for threatened, endangered or declining species and/or habitats (C3)

As mentioned under Section 5.1.3 above, endangered marine turtles use the Spratly seamounts to nest, feed and migrate. Marine scientific research studies carried out in the Northern Spratly seamount areas in the late 1990s and early 2000s also found that other animal species that have become rare or extinct in other parts of the South China were found in the Spratly area, albeit in low numbers. These include the Humphead wrasse (*Cheilinus undulates)*, listed in CITES Appendix II.[876] All giant clam species found in the Spratly area (*Tridacna gigas, Tridacna maxima, Tridacna squamosa* and *Hippopus hippopus*) are also listed on CITES Appendix II and threatened with extinction if urgent measures are not taken to stop harvesting and trade.[877] The sperm whale (*Physeter microcephalus)*, now on CITES Appendix I, was recorded by sailors regularly in the late 18th and early 19th century.[878] However, there appears to be no update since.

Five species of *Mobula* rays are known to be found in the SCS where they used to be abundant: *M. japanica, M. tarapacana, M. eregoodootenkee, M. kuhlii and M. thurstoni.*[879] Two endangered species of sharks listed on CITES Appendix II are found (albeit in low numbers due to persistent overfishing) in the Spratly area as bycatch to tuna longlining fisheries: the hammerhead shark (*Sphyrna mokarran)* and the pelagic thresher shark (*Alopias pelagigus*).[880] Sightings of the whale shark *(Rhincodon typus)* are also reported in blogs by divers around Swallow Reef.

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[876] State of the Coral Triangle: Malaysia, Asian Development Bank, Mandaluyong City, Philippines, 2014. Available https://www.adb.org/sites/default/files/publication/42373/state-coral-triangle-malaysia.pdf; accessed 7 Mar 2022. HP Nguyen (1998) The Species Composition of Coral Reef Fishes in the Spratly Islands, Central SCS, in The Marine Biology of the SCS, B Morton (ed.), Proceedings of the Third International Conference on the Marine Biology of the SCS, 28 October-1 November 1996, Hong Kong University Press, Hong Kong [113-127]; and VL Nguyen et al (2008), supra note 860

[877] ML Neo et al (2017) Giant Clams (Bivalvia: Tridacninae): A Comprehensive Update of Species and their Distribution, Current Threats and Conservation Status, Oceanography and Marine Biology- An Annual Review 55: 85-388; Y Lyons et al (2018) Managing Giant Clams in the SCS, International Journal of Marine and Coastal Law 33: 1-28

[878] G Woolmer (2013) Historical distribution of whales shown by logbook records 1785-1913. Available on OBIS-SEAMAP at http://seamap.env.duke.edu/dataset/885; accessed 7 Mar 2022

[879] A Ali (2016) Introduction to Species (Mobula Rays), SEAFDEC Expert Meeting on the Commercially exploited Aquatic Species 16-17 May 2016, Bangkok, Thailand. See also N Picher et al (1999), Layang Layang, A drop in the Ocean, Natural History Publications Borneo, Kota Kinabalu, Sabah, Malaysia

[880] A Putsa et al SEAFDEC Report on Shark Species in Tuna Longline Fishing Operation by SEAFDEC Research Vessels (2005-2015). Available http://www.seafdec.org/documents/em-ceas_agenda5td.pdf; accessed 7 Mar 2022

The presence of species such as the Cheek-lined Wrasse (*Cheilinus diagrammus*) listed under CITES Appendix II,[881] and the Green Humphead Parrotfish (*Bolbometopon muricatum*) in the IUCN Redlist[882] is recorded from the Spratly area.

5.1.5 Vulnerability, fragility, sensitivity, slow recovery (C4)

Sixty-eight coral species occurring in Spratly area are listed as 'vulnerable to extinction' by the IUCN.[883] The SCS is also expected to be the subject of elevated ocean acidification, indeed greater than in the Pacific around Hawaii and in the Atlantic around Bermuda.[884]

The report which summarizes how the seamounts off the Cook Islands meet the EBSA criteria states that vulnerability, fragility, sensitivity and slow recovery are rated as high on the basis of a high proportion of sensitive habitats, biotopes and species being functionally fragile.[885]

5.1.6 Biological Productivity (C5)

Generally over the SCS, upwelling during the northeast monsoon in October-January improves low chlorophyll *a* concentrations in the surface layer of upwelling areas.[886] The reef waters are described as generally oligotrophic with low nutrient concentrations.[887] However, visible Sea Surface Temperature fronts can be observed throughout the year in the Spratly area.[888] This would enhance upwelling and nutrient concentration and thereby increase opportunities for enhanced primary productivity and result in biological productivity of the area of the Spratly

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[881] HP Nguyen (1998) The species composition of coral reef fishes in the Spratly Islands, Central South China Sea, in B Morton (ed), The Marine Biology of the South China Sea: Proceedings of the Third International Conference on the Marine Biology of the South China Sea, Hong Kong, 28 October – 1 November 1996 , Hong Kong University Press, Hong Kong, 1998: 113–127

[882] Nguyen et al (2008) supra note 860

[883] IUCN (2015) The IUCN Red List of Threatened Species. Version 2014.3. http://www.iucnredlist.org; accessed 7 Mar 2022

[884] TH Huang and TA Cheng (2010) The Influence of Anthropogenic CO2 in the SCS, International Conference on Marine Environment and Biodiversity Conservation in the SCS, Conference Proceedings, 16-17 July 2010, National Sun Yat-sen University, Kaohsiung, Taiwan

[885] See Ua Puakaoa Seamounts in the Western South Pacific, 2012 workshop report, supra note 714 and infra note 908

[886] CT Chen et al (2001) Nutrient budgets for the SCS basin, Marine Chemistry 75: 281-300

[887] TD Hoang et al (2008) Some aspects of chemical oceanography in reef waters of the Spratly Islands, SCS, Proceedings of the Conference on the Results of the Philippine-Vietnam Joint Oceanographic and Marine Scientific Research Expedition in the SCS (JOMSRE-SCS I to IV) [185-195]

[888] MA Lee and Y Chang (2008) SST Fronts in the SCS, in Satellite Remote Sensing of SCS, AK Liu et al (eds.), Tingmao Publishing Company, Taipei-Taiwan: 187-198

being greater than that of the surrounding oceanic waters.

Heileman (2009) describes the SCS Large Marine Ecosystem (LME) as a moderate production ecosystem.[889] Capture fisheries data show an increase in productivity from 13.7% in 2000 to 21.5% in 2014 globally.[890] The area of the Spratly seamounts is, regionally, a well-known important fishing ground for reef fish and associated pelagic fisheries such as tuna and mackerel.[891] However, several studies report that this apparent increase in capture fisheries production hides a decrease in volume of larger predatory fish such as tuna and grouper being slowly replaced by smaller fish that feed on zooplankton, and therefore lower on the food-web.[892] Thus, although the precise contribution of the Spratly seamounts to capture fisheries production does not appear to have been clearly established, its regional importance is also clear.

On the basis of the information gathered on primary productivity and fisheries productivity in the Spratly area, it appears that overall, the biological productivity of the area can be rated as medium.

5.1.7 Biological Diversity (C6)

Coral reefs with the highest level of coral species richness in the SCS are found on the Spratly seamounts (333 coral species, or 58% of the 574 coral species diversity in the SCS or 55% of the 605 species in the Coral Triangle).[893] The reefs of the Spratly seamounts are also important for maintaining the biological diversity of coral reefs in the SCS, an essential

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[889] S Heileman (2009) VIII-15 SCS LME, in the UNEP Large Marine Ecosystem Report: A perspective on changing conditions in the LMEs of the world's Regional Seas, K Sherman (ed.), UNEP Regional Seas Report and Studies, United Nations Environment Programme, Nairobi, Kenya

[890] SEAFDEC 2017, The Southeast Asian State of Fisheries and Aquaculture 2017, Southeast Asian Fisheries Centre, Bangkok, Thailand , Available http://www.seafdec.org/download/southeast-asian-state-fisheries-aquaculture-2017/; accessed 8 Mar 2022

[891] See for example, Nguyen et al (2008) supra note 860

[892] VT Christensen et al (2003) Fisheries Impacts on the SCS Large Marine Ecosystem: A Preliminary Analysis using Spatially-Explicit Methodology, in Assessment, Management and Future Directions for Coastal Fisheries in Asian Countries, G Silvestre et al (eds.) Worldfish Center Conference Proceedings 67(1): 51-62; B Stockwell and VL Nguyen (2008) Reef Fish Stocks of the Northern Spratly Islands: A Summary of the findings of JOMSRE-SCS III and JOMSRE-SCS IV, in Proceedings of the Conference on the Results of the Philippines-Vietnam Joint Oceanic and Marine Scientific Research Expedition in the South China sea (JOMSRE-SCS I to IV), Technical Cooperation Council of the Philippines, Oceanfriends Foundation, Inc, Dumaguete City, Philippines [21-35]. Also Nguyen et al (2008) supra note 860

[893] Huang et al (2015) and Waheed et al (2015) supra notes 842 and 859, respectively

component of the preservation of the tree of life. Finally, they may also be critical for the preservation of rare coral species, such as those in the Paracels,[894] due to the larval connectivity between these areas and genetic supply role played by reefs in the Spratly area to the Paracels (see section 5.1.10 below). Species richness of reef fish is also generally reported as high in the Spratly area in comparison with that of surrounding coastal reefs: as an example, more species were recorded on one of the seamounts (Swallow Reef) than on any other coral reef area of Malaysia.[895]

Despite some anecdotal evidence of the presence of deep-water corals in the Spratly area, recent surveys demonstrate the validity of the prediction that they should occur in the SCS. Roberts et al (2009) reported only two species on the margin of the SCS: *Madrepora oculata* and *Goniocorella dumosa*.[896] More recently, transect surveys along the outer margin of Vietnam (western Spratly area) and some transects in the northern part of the Spratly area provide a new picture. Over 24 species were identified in 12 stations of the western Spratly area.[897] Dai (2017) reported 190 species of deep-sea scleractinians identified around Pratas Island, Macclesfield Bank and Itu Aba and found that their distribution and community structure suggest that the SCS is likely to host a very high diversity of them.[898]

Many of the seamounts considered by scientific workshops to meet the EBSA criteria of biological diversity in reports acknowledged by the CBD COP rely on a presumption of high species richness. When data are lacking, the analyses tend to rely on the geophysical characteristics of seamounts: the fact that they extend several thousands of meters from the seafloor and often to the photic zone and have steep slopes, thereby supporting a variety of habitats and biotopes and therefore a variety of conditions that influence faunal distinction and composition. This is expected to translate into high biodiversity, especially in tropical seas

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[894] Huang et al (2016), supra note 857. The authors also make the point that the choice to focus on biodiversity richness or rarity (two components of biodiversity) can affect regional priorities of conservation considerably.

[895] Maritime Institute Malaysia. 2006. Malaysia National Coral Reef Report. UNEP-GEF project and Marine Park Section, Ministry of Natural Resources and Environment, Malaysia and Nguyen et al (2008) supra note 860

[896] JM Roberts et al (2009), Cold-Water Corals – The Biology and Geology of Deep-Sea Coral Habitats, Cambridge University Press

[897] YA Latypov (2014) A Solitary Deep-Water Coral of the Scleractinian of the Vietnamese Shelf, American Journal of Zoological Research, 2(1):5-15

[898] CF Dai (2017) Octocorals and Deep-Sea Scleractinians in the SCS, 2017 International Symposium on Coral Reef Conservation in the SCS, 5-7 Nov 2017, Academia Sinica, Taipei, Taiwan

example, Ua Puakaoa Seamounts and the Kadavu and the Southern Lau Region).[899] This reasoning can be applied to the Spratly seamounts which extend from a depth of 2000-3000 m to the surface or near-surface.[900]

5.1.8 Naturalness (C7)

The Spratly seamounts are isolated oceanic seamounts and difficult to access. This characteristic has provided some natural protection against human activities and developments. Nevertheless, human activities are reported in this area (especially from fishing, including destructive practices, and building of offshore installations and other infrastructure on reefs). Decreased biomass and localized reef destruction are widely reported adverse effects.[901] The naturalness can therefore be rated as medium.

5.1.9 Representativity (C8)

The uniqueness of the Spratly seamounts as seamounts that rise from the deep basin of the SCS make them representative of a particular habitat in the context of Southeast Asia's biogeography. However, this criterion may also be understood to justify the selection of a subset of the Spratly seamounts rather than the overall area. A comparative analysis of the seamounts and differences in species assemblages in different parts of the Spratly area could inform such a selection. A present, the data are generally scattered and therefore lacking for such a comparative analysis.

5.1.10 Connectivity (C9)

The Spratly seamounts stand on the southern margin of the abyssal plain in the SCS. They can be treated as a distinct unit based on the biogeography of the region and the hydrodynamics of the SCS basin. Studies of surface current circulation in the SCS show that it is mainly driven by the winds of the two monsoons; the 'winter' monsoon which blows primarily from the northeast and the 'spring' monsoon which blows from the southwest. They translate into

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[899] Supra note 886 and infra note 907

[900] Nautical charts 17010 to 18800, Navigation Guarantee Department of the Chinese Navy Headquarters (China), 2005-2013. See also supra note 856

[901] AC Alcala (2008), supra note 860. See also The SCS Arbitration (Philippines vs. China), Arbitral Award of 12 July 2016, PCA Case No 2013-19. Available https://www.pcacases.com/web/sendAttach/2086; accessed 8 Mar 2022

surface current reversals in different parts of the Spratly seamounts during each monsoon.[902]

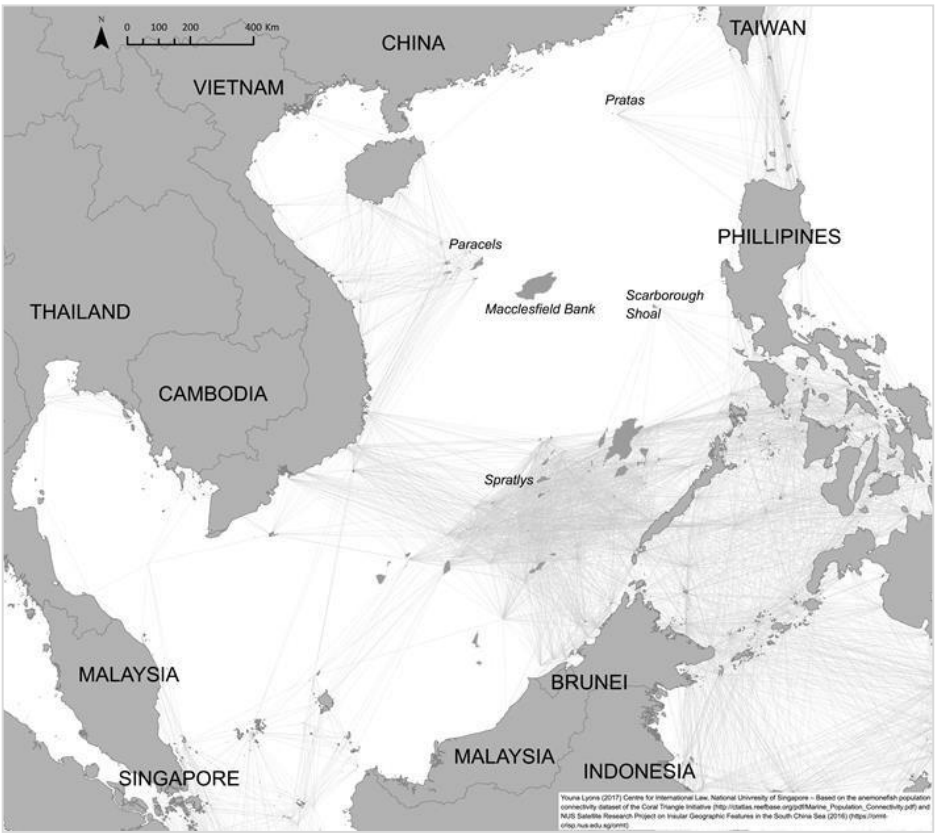

Figure 5.1: Population connectivity of Anemonefish in the SCS

Hydrodynamics are a critical factor in the modelling of larvae transport and ecological connectivity for anemonefish, coral and reef fish taxa.[903] Figure 5.1 below illustrates this for the larvae of anemonefish.[904] The grey lines show ecological connectivity between the Spratly seamounts and the Sulu Sea, the Paracels, Scarborough Shoal, southeast Vietnam and Natuna islands. Other studies demonstrate this ecological connectivity of the Spratly seamounts with other reefs in the SCS and in the Sulu Sea.[905]

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[902] Shaw PT and Chao (1994), supra note 862

[903] EA Treml and PN Halpin (2012) Marine population connectivity identifies ecological neighbours for conservation planning in the Coral Triangle. Conservation Letters, 5(6): 441-449

[904] Figure 5.1 was been drawn by the author in ArcGIS on the basis of dataset available on the website of the Coral Triangle Atlas at http://ctatlas.reefbase.org/mapgallery.aspx; accessed 8 Mar 2022, based on Treml and Halpin (2012), ibid The base map layer was obtained from NUS Satellite Research Project on Insular Geographic Features in the SCS, supra note 856

[905] Kool et al (2011), Dorman et al (2015), Huang et al (2015), Huang et al (2016) supra notes 862, 44, 841 and 857, respectively

The Spratly seamounts located at the centre of this connectivity network cover an area of 250,000 km^2.[906] This surface area is comparable to or smaller than other ocean areas with seamounts that are considered to meet the EBSA criteria such as, for example, the New Hebrides Trench Region or the South Tuvalu/Wallis and Futuna of the Fiji Plateau.[907] The size of the Spratly seamounts and its ecological significance to the SCS are also comparable to that of the Sicilian Channel EBSA in the Mediterranean Sea.[908]

5.1.11 Refugia *against adverse conditions (C10)*

Application of this criterion is linked to the developing science on understanding the steps needed to adapt to the effects of climate change in the marine environment.[909] This is as a developing research topic in Southeast Asia. Global marine scientific research on the effects of climate change on marine systems highlights the particular sensitivity of coral reefs to thermal stress and ocean acidification[910] and, therefore, the vulnerability of Southeast Asia.[911]

The 2022 Sixth Assessment from the IPCC finds that warm-water coral reefs face near-term threats to their survival if no adaption and mitigation measures are adopted in accordance with the agreements made under the UNFCCC.[912] Since the IPCC warning in 2007 that Asian

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[906] Author's own calculation in ArcMap (ESRI-ArcGIS) based on the area of a polygon including all the disputed Spratly features as depicted in Figure 2.1

[907] EBSAs identified in the Western South Pacific Region UNEP/CBD/SBSTTA/16/INF/6. Available https://www.cbd.int/doc/meetings/mar/rwebsa-wspac-01/official/rwebsa-wspac-01-sbstta-16-inf-06-en.pdf; accessed 8 Mar 2022

[908] Sicilian Channel EBSA in the information sheet of the Clearing-House Mechanism of the Biological Diversity Information Submission Service. Available https://chm.cbd.int/database/record?documentID=204108; accessed 8 Mar 2022

[909] See Chapter 3 Section 3.1.11

[910] C Cacciapaglia and R Van Woesik (2015) Global Change Biology 21: 2272:2282; JM Pandolfi et al (2011) Projecting Coral Reef Futures Under Global Warming and Ocean Acidification, Science 333: 418-422 and LA Feely et al (2011) An International Observational Network for Ocean Acidification, a white paper by leading scientists in this field. Available http://goa-on.org/documents/resources/Feely-OceanObs09.pdf; accessed 8 Mar 2022

[911] On the global decrease in aragonite saturation which shows the sensitivity of Southeast Asia, see https://www.epa.gov/climate-indicators/climate-change-indicators-ocean-acidity; accessed 8 Mar 2022

[912] IPCC 2022 a, supra note 706

coastal waters are likely to lose around 30% of their coral reefs in the coming 20 years,[913] each report update has only confirmed the trend and increased the confidence and magnitude of predictions of adverse effects, as well as the scope of the repercussions on the loss of ecosystem services to society.[914] In its 2022 report, the IPCC finds that in the southeast Asian region, threats from both warming and acidification are expected to result, by 2030 in 99.5% reefs being affected, and by 2050, 95% are expected to be in the highest levels of threatened category.[915] This vulnerability of tropical reefs to warming is linked to the fact that many species already live at the upper limit of their heat tolerance. [916]

Several papers on coral reefs in the Coral Triangle also highlight this risk. [917] The CTI-CFF Regional Plan of Action and the Comprehensive Action Plan of the SSME highlight the need for research on this topic. The former focuses on climate change adaptation and identifies a need to improve understanding of future climate change effects as a key target, including projections of vulnerabilities and effects; climate change resilience is also to be taken into account in the design of CTMPAS.[918] The latter mentions the establishment of resilient habitats and communities adapting to the adverse effects of climate change as a conservation outcome.[919]

Several papers point to a range of adverse effects from climate change processes in the region, including the SCS. These include ocean acidification, ocean warming,

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[913] RVF Cruz et al (2007) Asia Climate Change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, ML Parry et al (eds.), Cambridge University Press, Cambridge, UK, 469-506

[914] IPCC 2022 a, supra note 706

[915] Ibid [173]

[916] JM Lough et al (2018) Increasing thermal stress for tropical coral reefs: 1871–2017, Scientific Reports 8. Available https://www.nature.com/articles/s41598-018-24530-9; accessed 10 Mar 2022

[917] See McLeod et al on the occurrence of rapid changes in the sea surface temperature in the period 1985 to 2006 and the additional effect of decreasing aragonite saturation on coral reefs. E McLeod et al (2010) Warming Seas in the Coral Triangle: Coral Reef Vulnerability and Management Implications, Coastal Management 38: 518-539; RA Feely et al (2011), supra note 910. A Green and A White (2012) Integrating Fisheries, Biodiversity and Climate Change Objectives into MPA Network Design in the Coral Triangle, Report prepared by The Nature Conservancy for the Coral Triangle Support Partnership [28-29]. Available http://www.coraltriangleinitiative.org/sites/default/files/resources/CTSP_Resilient%20MPA%20Design%20Project.pdf; accessed 10 Mar 2022

[918] CTI-CFF RPOA [31, 38-39], supra notes 825 and 826

[919] Comprehensive Action Plan of SSME [14, 21 and 61], supra note 825

extreme events[920] and difficulties encountered in the prediction of effects, with a particular emphasis on coral reefs.[921] Nevertheless, Asner et al highlight limits in the use of satellite imagery to monitor coral reef cover accurately and the cost involved in improving this accuracy.[922] No basin-scale study could, for instance, be found on the thermal refugia potential of deep reefs in the SCS, such as those found on the seamounts of the Spratly area.[923] Cacciapaglia and Van Woesik, who modelled reef-coral refugia globally, highlight that deep reefs may only be refugia for shallow coral reefs if there is sufficient larval connectivity between different areas.[924]

Overall, information is still limited information on the identification of marine areas in the SCS that are particularly sensitive or resilient to climate change processes at a regional or basin-wide scale and of identifications of potential refugia. This is true of all species and habitats despite the greater focus on reef-building corals observed in the scientific literature.

5.1.12 Overall ecological assessment summary

The Spratly seamounts meet eight of the 10 ecological criteria with different levels of confidence.

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[920] Typhoon activity and intensity in the SCS may also increase as a result of climate change. J Sun and L Oey (2017) Sea level rise, surface warming and the weakening buffering ability of SCS to strong typhoons in recent decades, Nature Scientific Report 7. Available https://www.nature.com/articles/s41598-017-07572-3; accessed 10 Mar 2022

[921] R Cai et al (2017) Response and adaptation to climate change in the SCS and Coral Sea, in W Leal Filho (ed.) Climate Change Management: Climate Change Adaptation in Pacific Countries, 163-176; Y Liu et al (2014) Acceleration of modern acidification in the SCS driven by anthropogenic CO2, Nature Scientific Reports 4:5148. Available https://www.nature.com/articles/srep05148; accessed 10 Mar 2022. Other papers point to the complexity of the systems and that models may overestimate ocean acidification (G Wei et al (2015) Decadal variability in seawater pH in the West Pacific: Evidence from coral δ11B records, Journal of Geophysical Research: Oceans 120:7166-7181), as well as not take into account reef-scale processes which show that different parts of a reef system are not homogeneously affected. See KRN Anthony et al (2011) Coral reefs modify their seawater carbon chemistry – implications for impacts of ocean acidification, Global Change Biology 17: 3655-3666. Bruno and Selig (2007) found that coral reef cover is decreasing by 1% per year in the SCS. JF Bruno and ER Selig (2007) Regional decline of coral cover in the Indo-Pacific: Timing, extent and sub-regional comparisons, PLOS Biology. Available http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0000711; accessed 10 Mar 2022

[922] GP Asner et al (2017) Coral Reef Assessment in the SCS Using Planet Dove Satellites, Remote Sensing in Ecology and Conservation, Oxford, 3: 57-67

[923] Mao et al found that marine heatwaves impair the thermal refugia potential of marginal reefs in the northern SCS, Mao et al (2022) Marine Heatwaves Impair the Thermal Refugia Potential of Marginal Reefs in the northern SCS, Science of the Total Environment, 825: 154100. These authors also conclude that there are no thermal refugia for coral reefs in the northern CSC. Thermal refugia in deeper water have been studied in other parts of the world oceans also for other marine habitats. See for example Assis et al (2016) Deep reefs are climatic refugia for genetic diversity of marine forests, Journal of Biogeography 43: 833-844

[924] Supra note 911 [2281]

Table 5.1: Assessment of the Spratly seamounts against the ecological Reference Criteria Set

Criteria	Ranking of criterion relevance			
	Unknown	***Low***	***Medium***	***High***
Uniqueness or rarity (C1)				X
Special importance for life history of species (C2)				X
Importance for threatened, endangered or declining species and/or habitats (C3)			X	
Vulnerability, fragility, sensitivity, slow recovery (C4)				X
Biological productivity (C5)		X		
Biological diversity (C6)			X	
Naturalness (C7)			X	
Representativity (C8)	X			
Connectivity (C9)				X
Refugia (C10)	X			

Biological productivity is the weakest criterion based on the generally oligotrophic character of the area. However, relatively higher productivity is expected around the shallow or exposed parts of seamounts. It is noted that few models are at a scale where discrete areas of higher productivity can be identified. Despite the lack of data, the Spratly seamounts score high on four criteria and medium on three others (due partly to data gaps). There are also data gaps for two criteria (C8 on representativity and C10 on refugia) which are therefore not met with confidence.

5.2 Application of the non-ecological criteria

The six non-ecological criteria from the Reference Criteria Set are applied to the Spratly area.[925] However, given the general lack of peer-reviewed and quantitative data on non-ecological aspects of this area, related criteria are considered together. The extent to which the criteria are met is discussed and data gaps are identified.

5.2.1 Economic and Social Value (C11 and C12)

The criterion of Economic Value focuses on the extent to which an area is productive and provides monetary benefits, such as a source of food for local human population and their livestock and whether it benefits the local and national economy. By contrast, the criterion of

[925] Supra Part 1 Chapter 3 Section 3.2

Social Value focuses on non-monetary benefits to society.

Several articles highlight the importance of the Spratly area to fishermen from the countries that border the SCS, especially to tuna and coral reef fisheries and giant clam harvesting.[926] Economic value is also derived from export of coral reef larvae to coastal reefs that are essential to coral reef fisheries.[927] Although peer-reviewed and quantitative data on the precise contribution of the Spratly areas to the economies of the surrounding states are lacking, the above-mentioned publications on the importance of the Spratly areas to coastal populations suggest that the economic value would at the minimum be of a medium rating.

The non-monetary value of the Spratly area emerges very clearly from the extreme importance attached to this sea area by the bordering states, also demonstrated by its political sensitivity.[928] As such the non-monetary value may be rated as high.

5.2.2 Educational Value (C13)

Given the limited number of civilians that can go to the Spratly area, the Spratly seamounts currently have only an overall low educational value. [929] However, as shown by the divers that

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[926] About reefs in the Spratly area being a source of coral reef fish and invertebrates to coastal fisheries, see JW McManus (1994) The Spratly Islands: a Marine Park?, Ambio 23:181-186 and McManus (2010), supra note 860. On the migration of tuna fisheries throughout the Spratly area, see PM Aliño et al (1996) The fisheries potential of the Kalayaan Island Group, SCS, in B Morton (ed.) The marine biology of the SCS, Proceedings of the third international conference on the marine biology in the SCS, Hong-Kong 28 October-1 November 1996, 219-226. On the importance of the Spratly area to fisheries and clam shell harvesting, see Lyons et al (2018) supra note 877. See also, on the development potential for fisheries in the Spratly area, Q Wu et al (2016) Preliminary Study on the Fisheries Catches in SCS via Light Falling-Net Fishing Method, International Journal of Innovative Studies in Aquatic Biology and Fisheries 2: 1-4. Available https://www.arcjournals.org/pdfs/ijisabf/v2-i5/1.pdf; accessed 10 Mar 2022

[927] See Part 2 Chapter 5 Section 5.1.3 above

[928] Press articles show the attachment to the Spratly area by civilians in Vietnam and in the Philippines. For example, the 2014 riots in Vietnam, J Kaiman and K Hodal (2014) Anti-China riots turn deadly in Vietnam, The Guardian, 15 May. Available https://www.theguardian.com/world/2014/may/15/anti-china-riots-turn-deadly-in-vietnam; accessed 10 Mar 2022. See also RJ Heydarian (2015) Is the Philippines making a big mistake in the SCS?, National Interest, 3 August. Available https://nationalinterest.org/blog/the-philippines-making-big-mistake-the-south-china-sea-13480; accessed 10 Mar 2022

[929] Most reefs in the Spratly area are submerged at high tide and cannot host human populations. Very few islands have civilians and regular flights. These include Swallow Reef (Layang Layang in Malay, occupied by Malaysia) and Itu Aba (Taiping in Chinese, occupied by Taiwan). Thitu Island, occupied by the Philippines, also has civilians but no regular flight service or tourism.

visit Swallow Reef,[930] and the few marine scientific research expeditions organised over the years in different parts of the Spratly area,[931] they have an important potential educational value.

5.2.3 Cultural or Traditional Value (C14) or Cultural, Religious or spiritual significance (C15)

Except for transient and opportunistic fishermen and guano harvesters, the Spratly seamounts had remained primarily uninhabited, and had no stable community of people for whom these features constituted a home until the recent maritime disputes. [932] These triggered civil and military occupations by claimants. The Spratly seamounts do not appear to have a cultural value. This view is consistent with Sasges's (2016) historical demonstration that until the creation of the map by the Indochinese Institute of Oceanography between 1925-1939, no accurate map or representation of the Spratly area existed.[933] In this context, it seems difficult to argue that the Spratly area has an important historical and cultural value. However, they may have had a traditional value for fishermen from the surrounding coastal states who have been coming through the Spratly area since the 18th century and maybe earlier.[934] They have no known cultural, religious or spiritual significance.

5.2.4 Scientific Research Value (C16)

Despite maritime disputes generally hampering marine scientific research, the value of the

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[930] Layang Diving Resort offers regular flights to all tourists. Available http://www.layanglayang.com; accessed 10 Mar 2022

[931] JOMSRE, supra notes 888 and 893. To note, on 17 November 2021, at 9th Philippines-Viet Nam Joint Permanent Working Group on Maritime and Ocean Concerns (JPWG-MOC), JOMSRE have been announced to be resuming; Available https://dfa.gov.ph/dfa-news/dfa-releasesupdate/29737-philippines-viet-nam-agree-to-resume-joint-marine-scientific-research-expedition; accessed 10 Mar 2022. See also A Satyawan (2018) The Diplomacy of Scientific Research in the SCS: the Case of Join to Oceanographic Marine Scientific Research Expedition Between Vietnam and the Philippines, IOP Conference Series: Earth and Environmental Science 129: 012024. Available https://iopscience.iop.org/article/10.1088/1755-1315/129/1/012024/pdf; accessed 10 Mar 2022; and the 2019 presentation by Alcala at the ASEAN Regional Forum which recounts the JOMSRE expedition. Available https://aseanregionalforum.asean.org/wp-content/uploads/2019/10/Annex-S-Dr.-Alcala-environmental-protection-in-the-Spratlys-SCS.pdf; accessed 10 Mar 2022

[932] Philippines vs. China, SCS Arbitral Award, 12 July 2016, supra note 902

[933] G Sasges (2016) Absent maps, marine science and the reimagination of the SCS, 1922-1939, The Journal of Asian Studies 75: 157-180 [159]

[934] Ibid [169]. See also MJ Valencia et al (1997) Sharing the Resources of the SCS, The Hague: Martinus Nijhoff Publishers. To note, this cultural and political significance of the Spratly area to China is also an element of China's arguments in support of its sovereignty claim to the area.

Spratly seamounts to marine scientific research is generally recognised.[935] Numerous marine scientific research expeditions have been undertaken. Aside from the Joint Oceanographic Marine Scientific Research Expedition in the SCS (JOMSRE-SCS),[936] many scientific research expeditions were organised by different claimants, resulting in the research papers used to apply the ecological criteria in Section 5.1 above.

5.2.5 Summary of application of non-ecological criteria

Application of the ecological and non-ecological criteria for the Reference Criteria Set to the Spratly seamounts shows that they potentially meet many of the criteria although, they have not been identified as a sensitive area under any of the applicable instruments. The following section discusses the possible application of the relevant instruments.

Table 5.2: Assessment of the Spratly seamounts against non-ecological Reference Criteria Set

Criteria	Ranking of criterion relevance				
	Unknown	***None***	***Low***	***Medium***	***High***
Economic Value (C11)				X	
Social Value (C12)					X
Educational Value (C13)			X		
Cultural or Traditional Value (C14)			X		
Cultural, Religious or Spiritual Significance (C15)		X			

5.3 Potential application of relevant legal instruments

5.3.1 Methodology

The types of sensitive areas considered for this analysis are those adopted in the context of an international instrument applicable to the SCS, including the Spratly seamounts. By contrast, VMEs and APEIs in the CCZ were not included.[937] Sensitive areas under the 1972 London Convention and its 1996 Protocol as well as the 1990 OPRC, were also left aside, as they primarily seek to avoid adverse effects from dumping activities on areas that may have been

[935] Larval dispersal models and field surveys show the ecological importance of the Spratly seamounts to the SCS basin and the Coral Triangle, including as an important source of genetic diversity. See section 5.1.10 above. See also MA Junio Meñez (2015) Biophysical and genetic connectivity in marine biodiversity conservation and management in the SCS, Journal of International Wildlife Law and Policy 18: 110-119

[936] Supra note 932 on the resumption of JOMSRE and reference to past expeditions

[937] See supra Part 1 Chapter 2 Sections 2.2 and 2.3

declared as sensitive under international, regional or domestic regulations or measures.[938] The extent of their applicability is also subject to debate as they are not adopted by all the littoral states of the SCS.[939]

The following types of sensitive areas were considered:

- EBSA
- Ramsar Site
- Areas of OUV
- IOSEA Marine Turtle Network
- EAAFP Flyway
- ASEAN Heritage Park
- ASEAN MPA
- Special Area under MARPOL
- PSSA
- Fisheries Refugia

Table 5.3: Ecological and non-ecological criteria adopted under the instruments applicable to the Spratly area to identify sensitive marine areas

Sensitive Area Type	Ecological Criteria										Non-Ecological Criteria					
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
EBSA	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0
Ramsar	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0
OUV	1	1	1	1	0	1	1	1	0	1	0	0	0	1	1	1
IOSEA Marine Turtles	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EAAFP Flyway	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0
ASEAN Heritage Park	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	0
ASEAN MPA	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1
Special Area under MARPOL	1	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0
PSSA	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
Fisheries Refugia	0	1	0	1	1	1	1	0	1	1	1	1	0	0	0	1

Legend:

A = Uniqueness
B = Life History
C = Endangered
D = Vulnerability
E = Productivity
F = Biodiversity
G = Naturalness
H = Representativity
I = Connectivity
J = Refugia
K = Economic value
L = Social Value
M = Educational Value
N = Cultural or Traditional Use
O = Cultural, Religious, Spiritual Significance
P = Scientific Research
Q = Other Considerations (legal and political)

[938] See supra Part 1 Chapter 2 Section 2.4

[939] See supra Part 1 Chapter 2 Sections 2.1 and 2.4

The criteria adopted to identify different types of sensitive area as included previously in Table 3.1, Table 3.2 and Table 3.3 are summarised here in Table 5.3. These were then compared with the criteria met by features in the Spratly area according to the scientific analysis conducted in section 5.2 above, based on the peer-reviewed scientific literature published mostly in the region and summarised in Table 5.4 below. Only criteria met at medium or high level were included as being met.

Table 5.4: Application of the ecological and non-ecological criteria of the Reference Criteria Set to the Spratly seamounts according to published peer-reviewed scientific findings

Sensitive Area Type	Ecological Criteria										Non-Ecological Criteria					
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Spratly seamounts	1	1	1	1	0	1	1	0	1	0	1	1	0	0	0	1

5.3.2 Results

The results in Table 5.4 are analysed in Table 5.5 below. They show the extent to which the Spratly seamounts meet the criteria needed for each type of sensitive area considered.

Table 5.5: Ecological and non-ecological criteria met by the Spratly seamounts for different types of sensitive areas

Types of sensitive areas	Spratly seamounts				
	# Ecological criteria met	% Ecological criteria met	# Non-Ecological criteria met	% Non-Ecological criteria met	% Criteria met overall
EBSA	7/9	77.8%	1/1	100.0%	80.0%
OUV	6/8	75.0%	1/3	33.3%	63.6%
ASEAN MPA	6/8	75.0%	3/6	50.0%	64.3%
Special Area under MARPOL	5/7	71.4%	1/1	100.0%	75.0%
Fisheries Refugia	5/7	71.4%	3/3	100.0%	80.0%
IOSEA Marine Turtles	7/10	70.0%	3/6	50.0%	62.5%
Ramsar Sites	6/9	66.7%	1/1	100.0%	70.0%
EAAFP Flyway	6/9	66.7%	nil	nil	66.7%
ASEAN Heritage Park	6/9	66.7%	0/3	0.0%	50.0%
PSSA	6/9	66.7%	3/6	50.0%	60.0%
Reference Criteria Set	7/10	70.0%	3/6	50.0%	60.0%

According to this analysis, the Spratly seamounts meet 50% to 80% of the ecological and non-ecological criteria adopted under each instrument. Overall, the Spratly area even meets 67% to 77% of ecological criteria for each type of sensitive area, demonstrating the ecological value of this area. However, despite meeting enough criteria theoretically, the Spratly seamounts have not been identified as sensitive areas by the coastal states under any of the possible instruments. Although this is assumed to be due to the political sensitivity of the area, the theoretical application of the instruments is discussed below.

5.3.3 Discussion

5.3.3.1 Identification as an EBSA

Based on prior identification of EBSAs and endorsements by the CBD COP, the ecological criteria should be sufficient for Spratly seamounts to qualify as an EBSA under the CBD.

However, they are not mentioned in the report of the regional workshop to facilitate the description of EBSAs in the Seas of East Asia.[940] The on-going review of the EBSA identification process by the CBD COP may provide a new mechanism to consider new areas or areas previously ruled out on different grounds and an opportunity to review the Spratly seamounts.[941] Such an opportunity could be particularly fruitful in the context of the SCS disputes, due to the characteristics of an EBSA under the international law of the sea. Of particular relevance is that this categorisation of the area as meeting the EBSA criteria creates an opportunity for cooperation without prejudice to the sovereignty, sovereign rights or jurisdiction of coastal states, or the rights of other states under UNCLOS.[942]

State obligations can be fulfilled unilaterally by states with regard to activities under their

[940] Supra note 178

[941] DE Johnson et al (2018), supra note 714; CBD COP 13 Decision XIII/12, 4-17 December 2016, Cancun, Mexico. CBD/COP/DEC/XIII/12. See also Part 1 Chapter 1 Section 1.1.4

[942] For example, CBD COP13 Decision XIII/12 para. 3, ibid

jurisdiction and control, be it by vessels flying their flag or by their nationals. It could also include areas under the jurisdiction and control of a state, including islands and other features occupied by a state, as well as the waters surrounding such occupied features, even if other states claim sovereignty over such islands or features. The state with effective control over a feature and its surrounding waters could monitor and therefore report on the components of biodiversity within this area.[943]

5.3.3.2 Identification as a Ramsar Site

The Spratly seamounts also meet several of the criteria based on which it could be listed as a Ramsar Site, and many of them qualify under the definition of 'wetlands'.[944] Furthermore, the Ramsar Convention is adopted by all the claimant states except Brunei.[945] However, no state has proposed to list it. This is hardly surprising given the listing procedure under the Ramsar Convention. Candidate sites must be located on a member state's territory and designated by that member state.[946] Following inscription on the Ramsar List, states have monitoring and reporting obligations which require effective control over the area and would be more difficult to exercise in areas subject to sovereignty or boundary disputes.[947]

Although no provision allows other member states to veto a site designation by another member state, member states must consult with other member states over the implementation of commitments arising from the convention on 'a wetland extending over the territories of more than one [member state] or where a water system is shared by [member states]'.[948] Furthermore, the COP is competent to discuss additions and changes to the List and political tensions could therefore result from the designation of an area that is

[943] See and Chou (2018), supra note 852 and Y Lyons et al (2019) Moving from MPAs to Area-Based Management Measures in the SCS, International Journal of Marine and Coastal Law 35: 1-31

[944] On the status of adoption, see supra Part 1 Chapter 1 Section 1.2.2, including the fact that oceanic reefs can qualify

[945] Ibid

[946] See supra Part 1 Chapter 1 Section 1.2.4

[947] Ramsar Convention Article 2(1). See also supra Part 1 Chapter 1 Section 1.2.4

[948] Ramsar Convention Article 5(1)

subject to sovereignty and/or maritime dispute with other member states.[949]

Several authors advocate the use of the Ramsar Convention and its institutions to manage transboundary water bodies and limit tensions in accessing resources.[950] Some even argue that the Ramsar Convention and its institutions provide a platform and mechanisms for environmental diplomacy and potentially even an infrastructure for dispute resolution.[951] Nevertheless, as exemplified by the literature, territorial disputes may fall within a particularly difficult category of disputes and areas that are the subject of this type of dispute do not appear to become listed as a wetland of international importance.[952]

5.3.3.3 Identification as an area of Outstanding Universal Value

All the littoral states in the SCS have adopted the World Heritage Convention and the Spratly seamounts meet several of its criteria of outstanding universal beauty. However, they do not meet an additional key condition- that an adequate protection and management system needs to be in place to ensure safeguarding - which is necessary for a site to become a World Heritage site. A 2002 expert workshop identified the 'Spratly Island Group' as a potential site for consideration as a World Heritage site. However, this proposal has not been followed up.[953]

Member states nominate sites located on their territory that meet the criteria for inscription on the World Heritage List.[954] According to the World Heritage Convention, the inclusion of a property in the World Heritage List requires the consent of the state concerned. The inclusion

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[949] Ramsar Convention Article 6(2)

[950] See J Lee (2015) The governance of wetland ecosystems and the promotion of transboundary water cooperation – opportunities presented by the Ramsar Convention, Water International 40: 33-47

[951] PJ Griffin and SH Ali (2014) Managing Transboundary Wetlands: The Ramsar Convention as a means for ecological diplomacy, Journal of Environmental Studies in Science 4: 230-239

[952] Relevant work in that context is the Peace and Conflict Impact Assessment by Hammill and Bescancon and their investigation into the extent to which conservation initiatives exacerbate conflict or promote peace. A Hammill and C Bescancon (2007) Measuring peace park performance: Definitions and experiences, in Peace Parks, SH Ali (ed.) MIT Press, Cambridge, USA. https://doi.org/10.7551/mitpress/7433.001.0001. They found that mediation over transboundary water supplies contributed to building confidence, and even cooperation, among adversaries and that 'Cooperative water management initiatives (…) may best demonstrate the potential of efforts to use environmental management to build peace'. However, examples of transboundary wetlands are mostly coastal or inland waterways rather than oceanic reefs.

[953] Report available https://portals.iucn.org/library/node/8507; accessed 20 Mar 2022

[954] Supra Part 1 Chapter 1 Section 1.3.4

of a property situated in a territory, over which sovereignty or jurisdiction is claimed by more than one state, shall in no way prejudice the rights of the parties to the dispute.[955]

The World Heritage Convention Operational Guidelines further state that transboundary nominations must be prepared and submitted jointly by states parties.[956] Nevertheless, there are no transboundary World Heritage sites in Southeast Asia, either terrestrial or marine.[957] The prospects for a Spratly nomination to the World Heritage List appear highly unlikely. Furthermore, the authority of the World Heritage Committee makes such a submission rather improbable. This Committee decides first whether to admit the site to the List. Subsequently, it monitors implementation of the Convention. By contrast, no such delegation of authority to an institutional body exists in the context of the Ramsar Convention.

5.3.3.4 Identification as a site of the IOSEA Marine Turtles Network

The Spratly seamounts are known to provide nesting and feeding grounds to marine turtles and resting habitats to migrating individuals, especially leatherback and green sea turtles.[958] The Spratly seamounts may meet enough of the ecological and biological criteria to justify its importance to endangered populations of marine turtles in Southeast Asia.

However, to qualify as a site in the IOSEA Marine Turtle Network, an area must also meet governance, socio-economic and political criteria.[959] Governance criteria include a legal framework, conservation measures and on-going research and monitoring. Socio-economic and political criteria include several sub-criteria such as the cultural importance and national significance of the site, the conduct of activities compatible with the conservation of marine turtles and their habitats, education and outreach, and the collection of ancillary benefits associated with the sites.

Given the on-going political tension on the areas and the difficulties often encountered by

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[955] World Heritage Convention Article 11(3)

[956] WHC17/01, Operational Guidelines for the Implementation of the World Heritage Convention [134], supra note 257

[957] 37 transboundary natural heritage sites, only very few are marine and coastal. They include the Wadden Sea shared between Germany and the Netherlands and the Kvarken Archipelago between Sweden and Finland.

[958] See Part 2 Chapter 5 Section 5.1.3 above

[959] Table 1.17 of the criteria for inclusion in the IOSEA Marine Turtle Site Network, supra Part 1 Chapter 1. For more background information on the IOSEA Marine Turtles Network, see Part 1 Chapter 1 Sections 1.4.2 and 1.4.3

claimants in carrying out activities around the reefs under their occupation in the Spratly area, it does not seem that these criteria could be fulfilled at this stage.

5.3.3.5 Identification as a site of the EAAFP

Sites in the EAAFP are designated on the basis of a proposal by member states in the partnership. Despite known congregations of seabirds on some Spratly seamounts, such as Swallow Reef, the EAAFP does not include any site on them and key species in the EAAFP do not include species found in the Spratly area.[960]

Although none of the species reported in the Spratly area are listed in the appendices of CITES and CMS, the size of the aggregations found on Swallow Reef could be sufficient for the site to qualify for the EAAFP. Criteria that would be met are, for instance, that a site regularly supports 5000 or more birds at one time during migration or 0.25% of a population; it seems that the crested tern would meet this latter condition on Swallow Reef.[961] However, Malaysia, which occupies Swallow Reef (Pulau Layang Layang in Malaysia) and appears to have declared this island as a bird sanctuary,[962] may be reluctant to designate this site in the EAAFP for fear of generating political opposition and disturbing the cooperative spirit in this organisation.

With respect to other reefs in the Spratly area, data are generally lacking on the size and seasonal aggregations of seabird populations found on other above-water reefs such as Amboyna Cay, Spratly Island, Thitu Island, Itu Aba, Northeast Cay and Southwest Cay. Guano deposits from seabirds known to have been harvested in large quantities from the Spratly area in the past suggest the presence of seabirds.[963]

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[960] List of the bird species found in the Spratly area and corresponding references: Part 2 Chapter 5 Section 5.1.3 and supra note 870

[961] Records are contradictory with respect to the species of crested tern found on the island, whether the lesser crested tern (Sterna bengalensis) or the great crested tern (*Sterna bergii*). However, given the resemblance between these species, it confirms the presence of one of them.

[962] N Pilcher et al (1999) supra note 870

[963] List of species found in the Spratly area with no indication of size: Avibase, The World Bird Database. Available https://avibase.bsc-eoc.org/checklist.jsp?region=sp; accessed 10 Mar 2022. On guano deposits, see D Hancox and V Prescott (1995) A geographical Description of the Spratly Islands and an account of hydrographic surveys amongst those islands, C. Schofield (ed.) International Boundaries Research Unit 1(6)

Additionally, the human constructions on the shallowest reefs of the Spratly seamounts are expected to increase existing threats to migratory and resident seabird populations as they have in the Paracels.[964] Existing threats to seabird pollutions also include effects from climate change and other anthropogenic pollution such as marine debris.

5.3.3.6 Identification as an ASEAN Heritage Park or as an ASEAN MPA

The Spratly seamounts do not meet the legal and management criteria for identification as an ASEAN Heritage Park. Furthermore, the list of ASEAN Heritage Parks does not appear to seek to be exhaustive but rather to focus on some exemplary parks.[965] Finally, ASEAN Heritage Parks are unilaterally nominated by states and such a unilateral nomination could be seen as a provocation in breach of the spirit of 'cooperation and understanding' for marine environmental protection agreed by ASEAN member states and China in the 2002 Declaration on the Conduct of Parties in the SCS.[966] Given these elements and the political sensitivity of this area for ASEAN,[967] the Spratly seamounts seem extremely unlikely to be nominated by a state as an ASEAN Heritage Park.

The situation of the ASEAN MPA guidelines is different as it does not provide an official list of MPAs that meet the criteria. It is only used as guidance, designed to promote regional consistency in the identification of sites where MPAs can be established. To that extent, the Spratly seamounts meet several of the criteria and these criteria could be taken into account

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[964] L Xu et al (2016) Decline of recent seabirds inferred from a composite 1000-year record of population dynamics, Scientific Reports 6: 35191. https://doi.org/10.1038/srep35191. Available https://www.nature.com/articles/srep35191#:~:text=The%20populations%20were%20relatively%20low,beginning%20at%20around%201850%20AD; accessed 10 Mar 2022

[965] See supra Part 1 Chapter 1 Section 1.5.1

[966] Article 5 of the Declaration on the Conduct of Parties in the SCS calls on 'self-restraint in the conduct of activities that would complicate or escalate disputes and affect peace and stability, including, among others, refraining from action of inhabiting on the presently uninhabited islands, reefs, shoals, cays, and other features'. [emphasis added] The language and the spirit of the provision are therefore not limited to construction works at sea and also apply in this context. 2002 Declaration on the Conduct of Parties in the SCS available at https://asean.org/declaration-on-the-conduct-of-parties-in-the-south-china-sea-2/; accessed 10 Mar 2022

[967] Frequent difficulties encountered by ASEAN members to agree on joint-statements that refer to the Spratly dispute are a good illustration. Recent examples are the conclusion of ASEAN talks between defence ministers without a joint-statement in 2015 and the retraction of the 2016 ASEAN statement expressing deep concerns on the SCS. ASEAN talks end without statement amid SCS row, BBC News, 4 November 2015, available at https://www.bbc.com/news/world-asia-34718196; accessed10 Mar 2022; R Latiff (2016) Southeast Asian countries retract statement expressing concerns on SCS, Reuters, 15 June, available at https://www.reuters.com/article/us-southchinasea-asean-idUSKCN0Z10KX; accessed 10 Mar 2022. Sato argues that this difficulty faced by the ASEAN with respect to the SCS maritime disputes is due to the inability of its members to unify their policy towards China. S Sato (2013) The rise of China's impact on ASEAN conference diplomacy: a study of conflict in the SCS, Journal of Contemporary East Asia Studies 2:95-110

should some or all claimants eventually decide to proceed with a joint designation.[968]

5.3.3.7 Identification as a Special Area under MARPOL or as a PSSA[969]

The Spratly seamounts could meet the oceanographic and ecological conditions for identification as a Special Area under MARPOL or a PSSA. However, both measures require demonstration of the risk from vessel traffic to the area. In the context of a Special Area under MARPOL, it must be shown that normal discharges unloaded in compliance with the standard requirements of MARPOL would be unacceptable, in light of the oceanographic and ecological conditions of the area, so that additional restrictions on discharges are necessary. However, the demonstration can be done on a sea-basin basis (for example, for the entire SCS) as it has been done for the entire Mediterranean Sea, Baltic Sea or North Sea.[970] With respect to PSSAs, the requesting state(s) must also show how the proposed measure will provide protection from the identified shipping effects.[971]

For both types of measures, demonstration of effects from shipping and benefits to be expected from limiting these effects is expected to meet two main categories of difficulties. [972] First, the Spratly seamounts are marked on nautical charts as 'dangerous grounds' for

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[968] See supra Part 1 Chapter 1 Section 1.5.2

[969] Special Areas under MARPOL involve several States and have been either adopted as part of the initial text or according to subsequent amendments to MARPOL; see supra Part 1 Chapter 2 Section 2.1.1. However, the designation of PSSAs follows a different procedure as they are voted as an MEPC resolution rather than an amendment to a treaty.

[970] See supra Part 1 Chapter 2 Section 2.1.1. The designation of the SCS as a Special Area under MARPOL Annex I or V can only be hypothetical given the reception facilities required and that the installation of reception facilities for the full implementation of MARPOL Annexes I and V are still the subject of on-going efforts as they are not yet in place in all the littoral States concerned. An example of on-going effort is the IMO-NORAD marine environment project on assistance to East Asian countries in ratifying and implementing IMO instruments for the protection of the marine environment. This project includes the implementation of MARPOL Annex I and the need for reception facilities for oil sludge. Project description available at https://www.imo.org/en/OurWork/PartnershipsProjects/Pages/MEPSEAS.aspx; accessed 10 Mar 2022

[971] See supra Part 1 Chapter 1 section 2.1.2

[972] A third political issue may not prevent the designation but could make it more complicated. It is that Taiwan, also a claimant and a player in the SCS, would not be involved in the IMO designation procedure as it is not a member of the United Nations or of the IMO. Taiwan ceased being a member of the United Nations when China became a member in its place in 1971. See for example, A Kozlov (2018) Taiwan's tough history with the United Nations, Taiwan Insight, 16 Feb, available https://taiwaninsight.org/2018/02/16/taiwans-tough-history-with-the-united-nations/; accessed 10 Mar 2022

shipping and ship traffic density is much less in this area than in surrounding areas.[973] Reefs located on the outer part of this area may be more exposed to shipping traffic. A CIL map of ship traffic density in Southeast Asia shows the presence of sustained shipping traffic along several reefs that form the outer boundaries of the Spratly seamounts: Seahorse Shoal, Bombay Shoal, Royal Captain Shoal, Half Moon Shoal, Swallow Reef and Royal Charlotte Reef on the eastern and southern sides and the deeper banks of the southwestern side of the area (Vanguard, Grainger, Alexandra, Prince Consort and Prince of Wales Banks).[974]

Second, degradation of the marine environment in the Spratly area is the subject of several articles that point primarily to overfishing and climate change.[975] This said, specific incidents showing direct risks from shipping and an increase in shipping traffic linked to human development of the reefs might make for a compelling case supporting the theoretical need for these measures.[976] Grounding accidents could, for instance, justify the establishment of areas to be avoided of traffic separation schemes. The extreme sensitivity and hazardous nature of the area could also justify special areas under MARPOL Annexes I and 5, both adopted by all the littoral states of the SCS.

Despite all these difficulties, it is not theoretically impossible for a compelling case to be made for the Spratly area to be designated as either a Special Area under MARPOL or as a PSSA. However, for these measures too, the political sensitivity of this area could compromise any designation attempt without participation by all of the interested states. It seems unlikely that any of these measures could be agreed at the IMO without the agreement of all the

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[973] See for instance, the British Admiralty BA Chart 3483 Mindoro Strait to Luconia Shoals and Selat Makasar, 04/30/2015, Folio 48 Eastern side of China Sea and Sulu Sea, British Admiralty, United Kingdom Hydrographic Office

[974] Map established for CIL in the context of a research on the impact of shipping traffic on sensitive areas in Southeast Asia. Y Lyons and HF Wong (2017) Ship Traffic Density, sensitive marine habitats and Marine Protected Areas in Southeast Asia. Available https://cil.nus.edu.sg/research/ocean-law-policy/, under Maps, Graphs and Tables; accessed 10 Mar 2022

[975] L Burke et al (2002) Reefs at risk in Southeast Asia, World Resources Institute, Washington DC. Available http://pdf.wri.org/rrseasia_full.pdf; accessed 25 Sep 2018. See also the update of this study for Asia Pacific, L Burke et al (2010) Reefs at risk revisited, World Resources Institute, Washington DC. Available https://www.wri.org/research/reefs-risk-revisited; accessed 10 Mar 2022. The arbitral award rendered in the SCS Arbitration also points to the more recent impact from man-made constructions on many of the reefs, supra note 901

[976] For instance, the grounding of a navy vessel of the Philippines on Half Moon Shoal at the end of August 2018 is an example of increased risks resulting from increased traffic in this dangerous area. Philippines informs China of grounded frigate amid SCS feud, Associated Press, 31 August 2018. Available https://www.voanews.com/a/philippines-informs-china-of-grounded-frigate-amid-sea-feud/4552417.html; accessed 10 Mar 2022

interested member states.

5.3.3.8 Identification as a Fisheries Refugia

Consistent with the importance of Fisheries Refugia highlighted in the SEAFDEC Guidelines on Responsible Fisheries Management, they have been proposed by participating states in the fisheries component of the inter-governmental UNEP-GEF SCS Project.[977] Seven out of nine of the littoral SCS states took part in this project; Singapore and Brunei did not as they were not eligible for GEF support. However, the areas in dispute were kept out of the scope of the project and the project focused primarily on coastal areas in the SCS.[978] Although China did not take part in the Fisheries component of the SCS/GEF Project, its initial focus was on the Gulf of Thailand, so the potential presence of Fisheries Refugia in the Spratly seamount area was clearly outside the scope of the project. However, the natural connectivity between the Gulf of Thailand and the SCS (the former being a part of the latter) and the focus of the project on spawning and nursery areas for fish stocks of transboundary importance resulted in the necessary extension of the geographic scope of the project to the SCS overall.[979] The sites proposed so far by departments and research institutes of the government ministries responsible for fisheries in the participating states are mostly located in coastal areas and none are in the Spratly area.

In addition to the political difficulties that may result from identifying Fisheries Refugia in the Spratly area, data seem to be insufficient on where such Fisheries Refugia may be located. This said, studies of high-resolution satellite images of the Spratly seamounts point to important fishing activities on the reefs and the isolation of these reefs from the surrounding mainland coastlines suggests that they are Fisheries Refugia.[980] Additional data are required to determine their criticality to important transboundary fish stocks.

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[977] S Chen (2013) Environmental cooperation in the SCS: Factors, actors and mechanisms, Ocean and Coastal Development 85: 131-140 [132]. See also supra Part 1 Chapter 2 Section 2.2.3

[978] On the scope of the UNEP/GEF project and the participation of China, ibid

[979] CJ Paterson et al (2013) Fisheries Refugia: a novel approach to integrating fisheries and habitat management in the context of small-scale fishing pressure, Ocean and Coastal Management 85: 214-229. Note that the surveys carried out for this project by SEAFDEC research vessel avoided the Spratly area.

[980] For example, numerous fishing vessels were observed over the reef slopes of Thitu Reefs, North Danger Reefs, Sabina Shoal and many others in the NUS Satellite Research Project on Insular Geographic Features in the SCS, supra note 856

5.3.4 Conclusion

This chapter shows that there is sufficient scientific data to available to demonstrate that the Spratly seamount meet many of the sensitive area criteria under applicable international instruments and competent intergovernmental processes. However, such identification and/or designation is made more difficult by the political sensitivity of the area due to the sovereignty and maritime boundaries disputes in this area. Further, this political sensitivity hinders the conduct of marine scientific research and the sharing of knowledge to fill scientific gap. It also hampers states' willingness to make management proposals under the applicable instruments.

First, the disputed nature of the area makes it difficult for state to meet the first condition of a proposal: proposal by a member state for a site located on its territory. To this extent, designation of areas of OUV and Ramsar Sites appear ill-suited to the Spratly seamounts.

Second, three other types of sensitive areas are living resource-specific and are handled by governments at a technical level: the IOSEA Marine Turtle Network, Fisheries Refugia and the EAAFP. Whilst in this way they may appear to be of a 'lower' political profile and therefore more suitable to the purpose, they involve active management measures. Thus, accepting identification of a site under any of them may be seen as an implied acceptance of the authority of the state having current control over this site. Furthermore, data are insufficient for the Spratly seamounts to meet the criteria of the first two categories.

By contrast, the procedure for the identification of EBSAs, Special Areas under MARPOL and PSSAs is not tied to one state or to waters under its jurisdiction. EBSAs have been identified within and beyond national jurisdiction for entire regions by groups of state representatives that do not all have a direct interest in each EBSA identified by the group. Furthermore, this identification is made without prejudice to the rights and jurisdiction of coastal states under international law. Special Areas and PPSAs can similarly be proposed to the IMO, by one of several states, with only the effect of the application of a navigation measure, either a further discharge restriction or a routeing measure applicable to all vessels coming through the area under the responsibility of the flag state. Assuming that claimant states would not block a request made by other claimants for one of these three types of sensitive areas (and subject to the conditions being met as set out above), they seem more suitable than the former category of sensitive areas.

Chapter 6: The interface of law and science

This last chapter addresses the last sub-question of the second research question: the legal status and significance of the sets of criteria examined in this study and that of the Reference Criteria Set. This question addresses the prospects of application of the Reference Criteria Set under international law, in the context of the implementation of UNCLOS, in the South China and beyond.

This examination seeks to answer the question: 'so what?' From a formalist perspective, these criteria could be dismissed as soft law, or as not even being law at all.[981] Do these criteria matter? Are they applied by states? May states ignore them? Do they influence the behaviour of states? What is the 'normative force' of these criteria?[982]

For the purpose of this analysis, this chapter is divided into two sections. The first one examines the legal status and significance of each set of criteria in the context of their own regime prior to discussing their congruence or mutual supportiveness. The second part investigates the application of these criteria in the context of UNCLOS and their role and legal strength in this context.

6.1 Legal status of the scientific criteria and the identification of sensitive areas

6.1.1 Legal status of the sensitive areas within their respective regime

6.1.1.1 Methodology and approach

As demonstrated in Part 1, all the sensitive marine areas identified in Southeast Asia are based on sets of criteria developed and adopted under the auspices of intergovernmental bodies. Most of these bodies have a legal and/or policy mandate, meaning that the outputs from these processes get a minimum political vetting from governments involved, an important element in the legal status of the document.

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[981] See A Boyle and C Chinkin, The Making of international law, Oxford University Press, 2007 and further discussion on the formalist approach *infra* note 984

[982] The approach adopted for this analysis is based on the identification of the elements of the interactional legal theory framed and posited by Brunnée and Toope in J Brunnée and SJ Toope (2000) International Law and Constructivism: Elements of an Interactional Theory of International Law, Columbia Journal of Transnational law 39: 19-74, and subsequent publications by these authors which further articulate this theory. Brunnée and Toope discuss the potential 'persuasive power' of international law and its normative force through certain 'norms' that possess a special ability to influence the self-perception and behaviour of international actors.

However, a critical feature of the outputs of these processes (adoption of the criteria and identification of areas) is that most of them would not qualify as hard law and possibly not even as 'law' under a formalist approach to the sources of international law.[983] This traditional approach, focused on the legality of the output,[984] has evolved through the progressive taking into account of non-binding rules of law or soft law and informal law-making within the body of international law.[985]

The prolific academic literature that discusses different definitions of soft-law and normativity of legal norms and their relationship involves both the legal and international relations disciplines offering different perspectives. Overall, they seek to identify legal norms, irrespective of whether they would be theoretically binding or non-binding under a formalist approach. Several authors consider that legal norms that may have a normative effect can be distinguished from political and non-legal outputs.[986] This body of literature focusses on the process of development of outputs and their application rather than solely the legality of the output.

The development of the interactional theory of international law is a key movement in this development and the path followed in this study.[987] It involves the analysis of the

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[983] This is based on the idea they are not a treaty provision, a general principle of international law or a custom. J d'Aspremont, The idea of 'rules' in the sources of international law, the British Yearbook of International Law, Oxford University Press, 2014 doi:10.1093/bybil/bru025. Dupuy explains in 1991 that '"soft" law is a paradoxical term for defining an ambiguous phenomenon. Paradoxical because, from a general and classical point of view, the rule of law is usually considered 'hard', i.e. compulsory, or it simply does not exist'. PM Dupuy (1991) Soft law and the international law of the environment, Michigan Journal of International Law 12: 420-435 [420]. On soft law, see also S Besson and J d'Aspremont (2017) The sources of international law: an introduction, in The Oxford handbook of the sources of international law, S Besson and J d'Aspremont (eds), Oxford University Press: 1-40; Boyle and Chinkin supra note 982; U Beyerlin, Different types of norms in international environmental law policies, principles and rules, in the Oxford Handbook of International Environmental Law, D Bodansky, J Brunnée and E Hey (eds), Oxford University Press, 2008, DOI: 10.1093/oxfordhb/9780199552153.013.0018

[984] Dupuy (1991) and Besson and Aspremont (2017), ibid. Or, for a critical view on the existence of soft law, L Blutman (2010) In the trap of a legal metaphor: International soft law, The International and Comparative Law Quarterly 59: 505-624

[985] C Redgwell, Sources of international environmental law: formality and informality in the dynamic evolution of international environmental law norms, in The Oxford handbook of the sources of international law, 2017: 939-959; D Azaria (2019) The International Law Commission's Return to the Law of Sources of International Law, FIU Law Review 13: 989-1006

[986] J d'Aspremont (2014), supra note 984. This approach flows from the development, in the last twenty years of the school of thought that brings the fields of international law and international relations together for a more realist understanding of the use of norms, of real-world practices and the processes of law-making in use where law and politics are inextricably linked and intertwine. See for example, SA Sheingold, The path of the law in political sciences: De-centering legality from olden times to the day before yesterday and M Shapiro, Law and politics: The problem of boundaries, in The Oxford Handbook of Law and Politics, GA Caldeira, RD Kelemen and KE Whittington (eds) Oxford University Press, 2008: 737-751 and 767-774, repsectively

[987] Supra notes 983 to 985

processes, the context, topic and types of decision made through intra-institutional activity, the actors involved and the formality and flexibility of the processes or lack thereof.[988] Several authors also focus on the process with an inductive approach to emerging signs of creation of normativity, prior to considering the sources by which this emergence of a new norm might have occurred. Many observe a continuum of transformation from non-legal to legal norms which can be described as a 'sliding scale of normativity'.[989]

With this approach, the identification of sensitive areas can be seen as the outcome of successive steps in the identification process. Each of these steps is the manifestation – and evidence- of distinct but ongoing interactions between participants in the relevant instrument(s) and/or intergovernmental body processes. They may therefore be viewed as building blocks[990] of a process of identification of sensitive marine areas.

6.1.1.2 Comparison and results

In order to compare the process of identification of sensitive areas across the bodies and families of instruments, the three interactional steps included in the respective instruments are identified, with respect to the output and the process followed, and set out in Table 6.1:[991]

- First, the adoption of the criteria for the identification of sensitive areas according to each family of instruments. They were all adopted by consensus according to institutional and legal and/or political procedures agreed among the members; (columns 2 and 3)

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[988] See for example PF Diehl and C Ku, The dynamics of international law, Cambridge University Press, 2010 [155-156] and B Koremonos, Institutionalism and International Law, in Interdisciplinary Perspectives on international law and international relations: The state of the art, JL Dunoff and MA Pollack (eds), Cambridge University Press, 2013: 59-82

[989] For example, J Brunnée (2002) COPing with consent: Law-making under multilateral environmental agreements, Leiden Journal of International Law 15: 1-52; F Romanin Jacur, The making of international environmental law, in Research Handbook on the Theory and Practice of International Law making, C Bröllman and Y Radi (eds), Edward Elgar, 2016 Bröllman and Y Radi, Introduction: International Law making in a Global World, in Research Handbook on the Theory and Practice of International Law making, C Bröllman and Y Radi (eds), Edward Elgar, 2016: 1-9.

[990] See Brunnée and Toope (2000), supra note 982 [68]; Brunnée and Toope (2011) Interactional Law: an Introduction, International Theory 3: 307-318; and Jutta Brunnée (2002) COPing with Consent: Law-Making Under Multilateral Environmnetal Agreements, Leiden Journal of International Law 15: 1-52

[991] This methodology also builds in the approach of Paulwyn et al developed to assess Informal International Lawmaking and also applied by FR Jacur. See J Pauwelyn (2012) Informal international law making: Framing the concept and research questions, in Informal International law making, J Paulwyn, R A Wessel and J Wouters (Eds), Oxford University Press: 13-34, and Romanin Jacur (2016), supra note 990. See also supra note 991 and infra note 995

- Second, the identification of areas on the basis of the criteria that were previously adopted; (columns 3 and 4)
- Third, the adoption of measures to protect this area: such measures may be included in the applicable parent instrument; alternatively, the sub-regime may have a mechanism in place for the adoption of such a measure. Another possibility is for the identification to be made deliberately without accompanying measures being designated within its instrument or regime.[992]

Table 6.1: Adoption of scientific criteria and area identification: Green = Normative intent and effect in area identification; Blue = No normative intent in the identification but actual or potential normative effect; Grey = No normative intent or effect.

Sensitive Area Type	Parent Instrument	Criteria Adoption Process	Area Identification for Submission	Area Endorsement or Identification	Follow-up within the sub-regime
EBSA	CBD	Resolution of the COP	Reg'l workshop with state-appointed experts	COP	No mechanism
Ramsar	Ramsar Convention	Resolution of the COP	Identification by Member states	Accepted if proposed but under review by COP for changes in ecological character	Yes, provided for
OUV	World Heritage Convention	World Heritage Committee	State(s) proposal	IUCN advise and decision by the World Heritage Committee	Yes, provided for
IOSEA Marine Turtles	CMS and MOU on IOSEA Marine Turtles	Resolution of Meeting of Signatory States	State(s) proposal	Resolution of Meeting of Signatory States	Reporting
EAAFP Flyway	Outside CMS Family but endorsed	Through Birdlife-endorsed by CMS COP	State proposal	Voluntary basis but includes information sheet with the criteria	No express mechanism
ASEAN Heritage Park	ASEAN Declaration	ACB	State proposal	Fully voluntary No review	No mechanism
PSSA and routeing measures	UNCLOS and IMO-MEPC	Resolutions of MEPC	State(s) proposal	Resolution of MEPC and MSC	Yes, provided for
Fisheries Refugia	UNCLOS and FAO Code of Conduct for Responsible Fisheries	SEAFDEC Council Resolution	Proposal from national technical fisheries officers within the WG	Only in WG reports	No mechanism for fisheries management measure at regional level

Three findings emerge from this comparison.

First, a critical key feature shared by these eight identification processes is that they

[992] This is the case for example of EBSAs (see supra Part 1 Chapter 1 Section 1.1.6). On another note, measures adopted at national level are not discussed in this context where the focus is on applicable rules of international law

developed under the auspices of an intergovernmental body with a legal and/or political mandate and a decision reached by consensus. Furthermore, the process of adoption involved the intra-institutional activity of a legal regime -formed by one or a family of instruments- that could qualify as a secondary decision-making process.[993] The decisions adopted offer different examples of the normal procedural functioning of the operating system of each body and/or legal regime.[994]

Second, an important shared attribute of these decisions is their precision with respect to the technical criteria, and the area identified,[995] whereas this is not true of the identification of measures that should or may be adopted in each area. Such measures are only specified in one of the processes, namely the shipping measures under the IMO. Although the processes resulting in these outputs developed in accordance with the institutional mechanisms of the intergovernmental bodies involved, another shared feature is the technical nature of the discussion and the involvement of technical experts rather than the involvement of traditional diplomatic actors (government representatives from state parties).[996]

Third, the criteria adopted and the areas identified are the result of on-going cooperation and collaboration between states in the context of legal instruments and institutional processes towards a shared goal, rather than the result of statutory authority.[997]

This author argues that these decisions illustrate of the progressive development of norms through international cooperation and were adopted along a continuum of cooperation

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[993] T Gehring, Treaty-Making and Treaty Evolution, in The Oxford Handbook of International Environmental law, D Bodansky, J Brunnée and E Hey (eds), Oxford University Press, 2008, supra note 983. Alvarez also identifies the technical documents adopted by international organisations as a separate form of law making of international institutional law, which is based primarily on soft law instruments. JE Alvarez, International organisations as lawmakers, Oxford University Press, 2005 [217- 218]

[994] See Chapters 1 and 2 on the provisions for each regime and the respective applications

[995] On the importance of the nature of the obligation it contains, the substantive precision and whether the decision was made though delegation to a body, see G Shaffer and MA Pollack, Hard and soft law and I Johnstone, Law-making by international organisations: Perspectives from IL/IR theory, in Dunoff and Pollack (2013): 226-292, supra note 988

[996] This would qualify as informality of the law-making process by the actors. See Pauwelyn et al which who deconstruct informality in law-making into three attributes: informality in the output, in the process or in the actors involved and in the adoption of a new output. J Pauwelyn (2012) Informal international law making: Framing the concept and research questions, in Informal International law making, J Paulwyn, R A Wessel and J Wouters (Eds), Oxford University Press [15-20]

[997] Diehl and Ku (2010), supra note 988

between political discussion and normative commitments.

6.1.1.3 Discussion of potential normativity

To examine the normative force (or 'pull')[998] of the outputs from the eight processes, this investigation now addresses the change in behaviour (as an expression of compliance) operated by the subsequent decisions relating to the designation of sensitive areas. The institutional processes for the identification of a sensitive area examined in Table 6.1 vary for each family of instruments. Table 6.1 shows a graduation from a traditional treaty law approach to a less obligatory and more informal, albeit technically specific and detailed, approach.[999]

Based on this analysis, the approach of each process can be characterised as more or less normative. The most normative process is one where the identification of an area as meeting the scientific criteria is normative. Normative intent must also be distinguished from normative effect, as they do not always coincide. Saying that an output is normative means that it steers behaviour of the actors who can be seen as acting in accordance with it.[1000] These decisions may be seen as internal to a legal system and some may even, to some extent, have an administrative, procedural or bureaucratic function within a specific family of instruments, a treaty system or intergovernmental mechanism. However, they all provide substantive contributions to the identification of sensitive areas.[1001]

The decisions relating to the identification of sensitive areas may not have created completely new law, as they instead elaborate on and provide substantive content to general treaty

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[998] This approach is based on the idea that (i) there is a continuum between political and legal commitments and that the progression between the two is fluid and a matter of degree and definitions; and (ii) that, irrespective of their legal status, they may influence the conduct of states. See for example, J Brunnée (2002) supra note 990 [34]; I Johnstone (2013) [274], supra note 995 and RA Wessel, Institutional law making: the emergence of a global normative web, in Research Handbook on the Theory and Practice of International Lawmaking, C Bröllman and Y Radi (eds), Edward Elgar, 2016: 179-200 [188]

[999] Three adoption processes are legally binding and have direct management implications under the same legal regime: Ramsar, OUV and PSSA or other IMO measures. (See corresponding sections in Part 1 Chapters 1 and 2). The other five do not trigger direct legal obligations under the regime concerned.

[1000] Brunnée (2002) discusses how the dichotomy binding/non-binding and legal formalism say little of the norm's ability to influence state conduct. See supra note 990 [32]

[1001] On the development of international environmental law through political and administrative decisions in treaty systems: Gehring (2008), supra note 994 [10-14]

provisions or common concerns of international law. However, they provide a level of detail that states should be unable to ignore without having to explain their decision to change position on the topic. In this sense, they are adding to the body of international law and state practice. That they result from a continuous flow of decisions and actions or interactional processes by contributing states make them even more compelling.[1002]

1. Normative intent and normative effect[1003]

PSSAs and their associated protective measures, areas of OUV, and Ramsar sites are binding on the parties under the applicable sectoral rules. These applicable binding rules also provide guidance and/or control on the way the area should be managed. This is the case despite the criteria themselves having been adopted in non-binding decisions of intergovernmental bodies. Note that only IMO measures specify activities that may not be undertaken (such as an area to be avoided). Rules applicable to the two other types of areas focus on the maintenance of the integrity or ecological character of the site rather that specifying activities than should not be carried out in the area.

2. No normative intent with actual or potential normative effect

IOSEA Marine Turtles Network sites, EAAFP Flyway sites and Fisheries Refugia all involve state delegations working in non-binding processes that have or are expected to result in binding measures at the local level, as is shown by the terms of reference of the Working Group on the Development of a Review Process under the Convention on Migratory Species and its applied and specific recommendations.[1004]

3. No normative intent or effect

The identification of EBSAs and ASEAN Heritage Parks are very different processes, but neither is intended to result in management measures specific to this type of sensitive area. The decisions of the CBD COP are very clear that the procedure to identify EBSAs is without

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[1002] Also supporting the view that international organisations can set standards through soft law instruments that may not be designed to be normative but become so. Alvarez (2005), supra note 994. On the power of continuous interactional processes, J Brunnée (2002) supra note 990 [6]

[1003] This discussion excludes a relevant but separate discussion on the effectiveness of the norm

[1004] This can also be facilitated by the State representatives who participate in those meetings, supra Part 1 Chapter 1 Section 1.4.6

prejudice to states' rights and jurisdiction with respect to activities in the EBSAs.[1005] ASEAN Heritage Parks are of a very different nature and require that a management measure be in place prior to nomination. However, no particular management measure is attached to this nomination.[1006]

The following sections investigate the interactions between these sets of criteria and identifications of sensitive areas and their standard-setting and/or law-making potential when considered as a whole under international law. As shown in the previous chapters, the criteria adopted for the identification of sensitive areas converge and overlap significantly to the point of most of them being congruent; they are also mutually supportive.

6.1.2 Congruence, mutual supportiveness and law-making in the emergence of a global normative web[1007]

Hurrell and Kingsbury as well as Redgwell highlight the importance of 'a widely shared scientific consensus on the nature of the problem and its solutions' for informal law-making on environmental issues to be possible.[1008] This study argues that the convergence observed in the instruments analysed does just this for the scientific and technical criteria adopted, endorsed or embraced in the context of a legal and/or institutional intergovernmental process. It is proposed that this convergence and mutual supportiveness support a law-making process whereby these criteria and their application are quasi-law as they are based on successive and consistent decisions endorsed by states. Consequently, it is further proposed that any later change of view by these states would risk undermining the international legal and institutional system they are relying on. Before exploring their application in the context of UNCLOS, the situation of congruence between sensitive areas identified under different processes and their potential contribution to law-making requires further discussion.

This section argues that these intergovernmental processes, in whose context the scientific criteria were adopted and applied to identify sensitive marine areas, may be shaping the emergence of new ecological standards for the identification of sensitive marine areas in

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[1005] See Part 1 Chapter 1 Section 1.1.6

[1006] Part 1 Chapter 1 Section 1.5.1

[1007] The term 'global normative web' is based on RA Wessel (2016). Wessel's conceptual approach is embraced in this study as well as further elaborated to reflect the interconnections between the norms of this web. See supra note 999

[1008] A Hurrell and B Kingsbury (1992) The international politics of the environment: actors, interests and institutions, Oxford University Press, Oxford/New York [19] and C Redgwell (2000) Multilateral environment treaty-making, in Multilateral treaty-making, V. Gowlland-Debbas (ed): 89-107 [97]

Southeast Asia. This argument is based on three elements. First, the substantive congruence of the sensitive criteria and their factual and technical application. Second, that these developments are the result of different processes from a varied landscape of mutually supportive, cross-fertilising intergovernmental processes, some of which may even be independent, yet remain consistent. Third, these congruent processes indicate broad state support and therefore legitimacy.

With respect to the substantive congruence, this investigation examines the congruence of processes that identify sensitive marine areas under international law from two angles: (i) congruence in the criteria adopted for their identification in the 15 legal instruments considered; and (ii) congruence in their application in Southeast Asia.

6.1.2.1 Congruent criteria for the identification of sensitive marine areas

Chapter 3 of this study compares the suites of ecological and non-ecological criteria adopted in 18 distinct intergovernmental mechanisms for the identification of sensitive marine areas: 14 are applicable to Southeast Asia[1009] and the four others were designed for four regional seas.[1010]

The congruence of ecological and non-ecological criteria is illustrated in Figure 6.1 below. All except one of ten ecological criteria are found over half of the suites of ecological criteria. The exception is the criterion of connectivity, not because its relevance is disputed, but because it is generally used as a criterion in the establishment of network of sensitive areas rather than in the first stage of identification of particular sensitive areas.[1011]

By contrast, only one of the six non-ecological criteria shows just over 50% congruence with the 18 sets of criteria: the scientific research criterion.[1012] However, this lack of parallel

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[1009] See Chapter 3 and in particular Graph 3.1 and Tables 3.1 and 3.2 on ecological criteria; see Graph 3.2 and Table 3.3 on non-ecological criteria. Note that the KBA adopted by the IUCN are not used for this legal assessment as they have not been adopted or endorsed by states in the context of a family of instruments or intergovernmental law- making processes.

[1010] See section 3.4 and Table 3.9

[1011] See the discussion on connectivity in Part 1, section 3.1.2 under C9 and in section 3.1.3

[1012] The criterion of importance of an area to scientific research to characterise it as sensitive is not widely recognised in the context of instruments applicable in Southeast Asia (see Part 1 section 3.2.2). However, it is a unanimous concern in the four regional seas considered, thereby bringing the congruence of this criterion to over 50% globally.

congruence found for five non-ecological criteria may be explained by the focus of most instruments on environmental concerns and therefore ecological sensitivity. These instruments do not focus on socio-economic considerations. Overall, this situation shows a lack of global interest for these criteria, although they are particularly critical in the context of the sustainable development focused on in Southeast Asia.[1013]

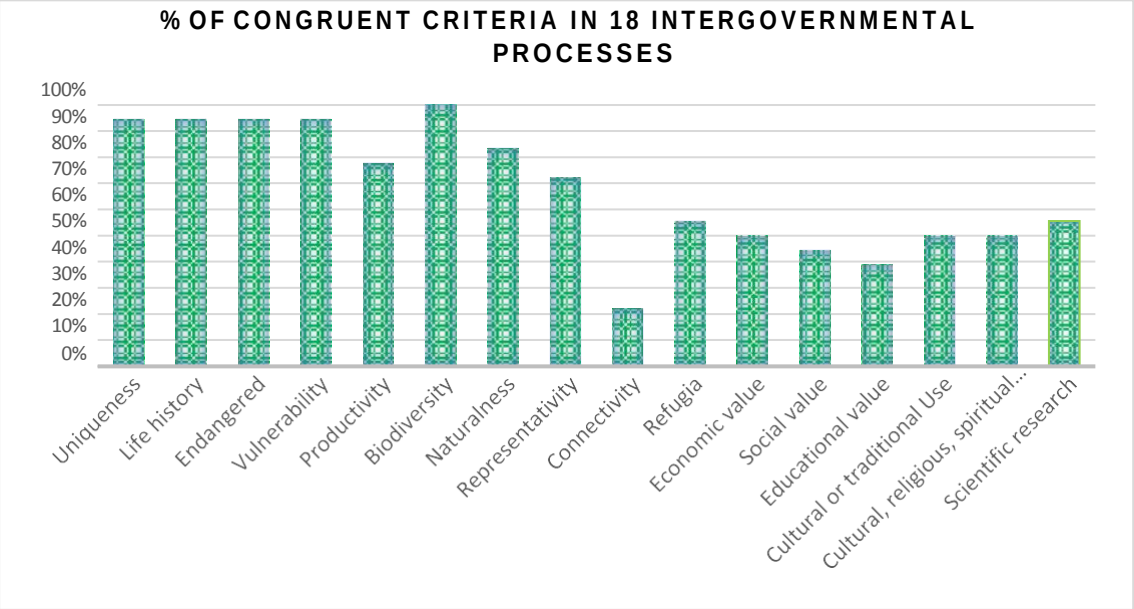

Figure 6.1: Congruent criteria

The high congruence of these processes and the substantial number of applications of these congruent criteria can be described as a high global aggregate activity demonstrating this congruence. This high congruence is particularly relevant to appreciate the global influence of the suites of criteria in marine environmental law-making in an international context.[1014] Their application in Southeast Asia is also of particular relevance in a regional context.

6.1.2.2 Congruent application of the criteria in Southeast Asia

The comparative analysis of the sensitive areas identified in Southeast Asia shows that 34 sensitive areas in Southeast Asia were identified several times with the same ecological

[1013] See the discussion on scientific research in Part 1 Chapter 3 Section 3.2 and Section 3.4.5 with respect to the criteria adopted in regional seas

[1014] F Romanin Jacur (2016) supra note 990 [423]

criteria and arguments used in different identification processes.[1015] Further investigation of the criteria used for the multi-identification of sensitive marine areas shows that all the ecological criteria were used several times, as well as most of the non-ecological criteria. The only exception is the criterion on cultural, religious or spiritual significance which has not been used. By contrast, the criterion on cultural or traditional use has been used 19 times.[1016]

Figure 6.2 below shows the criteria used in Southeast Asia to identify sensitive marine areas, based on the analysis Chapters 3 and 4.

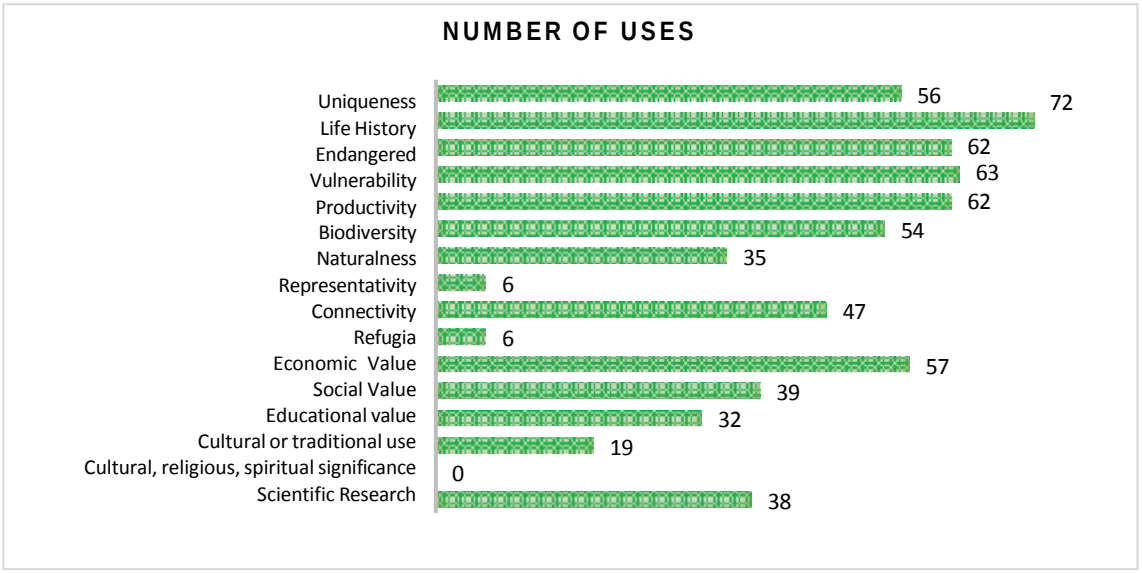

Figure 6.2: Number of uses in Southeast Asia

With respect to ecological criteria, it shows a constant use of 8 of the 10 criteria. The criteria of 'representativity and refugia' are less often used, though they have been used. Notably, this shows a discrepancy between the global approach and regional practice, as these two criteria are included in most sets of criteria adopted in the context of intergovernmental processes.[1017] By contrast, the criterion of connectivity is perceived as very important in Southeast Asia, possibly as a result of research on marine biodiversity in the region, especially motivated by the

[1015] See Part 2 Chapter 4 Section 4.1

[1016] See Appendix G and Table G.3 as well as Section 4.2.2 in Part 2 Chapter 4

[1017] See Part 1 Chapter 3 sections 3.2.1, 3.2.2 and 4.2.2 above

biodiversity richness in the Coral Triangle and research investment in this area.[1018]

6.1.2.3 Mutual supportiveness of the criteria and their application: from fragmentation to convergence to the emergence of new international standards or norms

One of the main reasons for the congruence between criteria and overlap in their application can be linked to the shared objective of most of the processes to protect the marine environment. This overlap shows the mutual supportiveness of these processes, especially with respect to the identification of subsets of the marine environment, such as endangered species that can be protected under CITES and the CMS, whose habitat can also be protected under the CMS, the WHC and the Ramsar Convention.[1019] For sea turtles, the IOSEA MOU and related instruments and mechanisms also seek to protect their foraging and nesting habitats, and for seabirds and shorebirds, the EAAFP identifies important resting and nesting areas.[1020] Finally, the CBD also identified several of these habitats as EBSAs.[1021]

The way in which different intergovernmental processes identify the same marine area as being ecologically sensitive according to their own set of rules and concerns shows the mutual supportiveness of these institutions. This is a manifestation of the process identified in the late 80s by which international environmental law progressively developed to address trans-sectoral and global issues.[1022] This development has also been nurtured and further developed through increasing interactions between treaty systems and influence among them.

With respect to the identification of sensitive marine areas, this cross-fertilisation and mutual supportiveness are also stimulated by the technical nature of the criteria and their application as well as their reliance on the same body of science, which is applicable across the bodies and processes. This is, for example, the case with respect to critical habitats of endangered migratory species such as whales (in particular their breeding or foraging grounds) being

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[1018] See for example I Asaad et al (2018) Designating Spatial Priorities for Marine Biodiversity Conservation in the Coral Triangle, Frontiers in Marine Sciences 5: doi.org/10.3389/fmars.2018.00400

[1019] See Part 1 Chapter 3 Section 3.1.2

[1020] Ibid

[1021] Ibid. See also Kot et al (2014) supra Part 1 note 347 and Johnson et al (2018) supra note 814

[1022] A Kiss (1989) Nouvelle tendances en droit international de l'environnement, German Yearbook of International Law 32: 241-263 [252]

identified as sensitive areas including as EBSAs, OUV and PSSA or routeing measures to avoid ship-collision.[1023] Another example is that of important seabirds or shorebird habitats being identified as sensitive areas, including as EBSAs, OUVs, Ramsar sites, CMS/EAAFP.[1024] A third example is the identification of nesting and foraging areas of marine turtles as EBSAs, OUVs, Ramsar sites, CMS/IOSEA MOU and even PSSA.[1025]

To further scrutinise and understand the reason for these findings, the historical developments of the criteria and their instruments are now examined, followed by a discussion of the potential importance of the technical nature of these criteria and its effect on the convergence and mutual supportiveness observed.

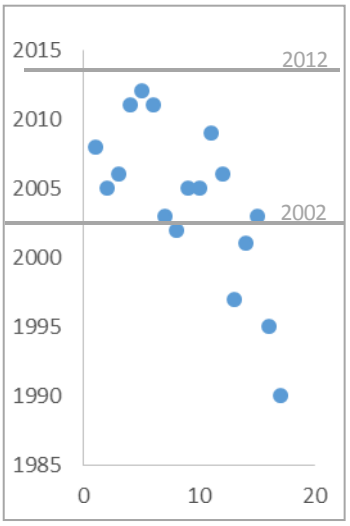

Figure 6.3: Years of adoption of the 17 sets of criteria in their current for

A historical perspective

The source instruments of the intergovernmental processes that led to the adoption of criteria for the identification of sensitive marine areas date back to the early 70s to 90s.[1026] However, 13 of the 17 current forms of the criteria examined in this study were adopted or acknowledged by the governing bodies of these processes over a period of 10 years, from 2002 to 2012.[1027] The other four were adopted between 1990 and 2000, following an introduction of the issue in 1978. (Figure 6.3 below)

Peet described the history of the first wave of development of criteria under the auspices of

[1023] See Appendix G Table G.3, note 774

[1024] See Appendix G Table G.3, note 774

[1025] For example Tubbataha Reefs in the Philippines. See Appendix G Table G.3, note 774

[1026] See introduction to Part 1 above

[1027] EBSA in 2008, Ramsar in 2005, OUV in 2006, CMS in 2011, IOSEA in 2012, EAAFP in 2011, ASEAN HP in 2003, ASEAN MPA in 2002, MARPOL special areas and PSSAs in 2005, VMEs in 2008, Fisheries Refugia in 2006, LC/LP in 1997 (now under review), Antarctic in 1991, OSPAR in 2003, the Mediterranean in 1995 and the Caribbean's in 1990. See Part 1 Chapters 1, 2 and 3

the IMO, which started in 1978.[1028] Gjerde recounted the history of the second more generalised wave of development that followed after the 2001 Vilm Workshop,[1029] which paved the way for the inclusion of the protection of vulnerable marine ecosystems in UNGA Resolution 58/240 (2003) following submissions to this effect by Australia and Germany; Both states were represented at the workshop.[1030] UNGA Resolution 58/240 subsequently catalysed and accelerated developments of the EBSA criteria and others in the second wave.[1031] The 2001 Vilm Workshop included 18 law of the sea specialists and made the link between the first and second wave of instruments relating to the protection of sensitive marine areas.[1032] This second wave, which developed from the early 2000s, was initially fuelled by a joint political and scientific impetus to conserve deep sea environments in areas beyond national jurisdiction.[1033]

However, the concerns over vulnerable or sensitive marine areas also developed subsequently within instruments also focused or primarily focused on marine areas within national jurisdiction, as shon by the date of adoption of scientific criteria for the identification of Ramsar sites, the Special Areas under MARPOL and PPSA guidelines (all in 2005), and subsequently OUV in 2006.[1034]

The realisation of the importance and influential nature of the standards and guidelines developed by governing bodies in international fora, and of their normative influence across fora through different connections between them, has surfaced in the academic literature in the last 10 years. Several authors have now highlighted and explored the cross-

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[1028] Peet (1994), supra Part 1 note 120

[1029] H Thiel and JA Koslow (eds), Managing Risks to Biodiversity and the Environment on the High Sea, Including Tools such as Marine Protected Areas—Scientific Requirements and Legal Aspects, Proceedings of the Expert Workshop held at the International Academy for Nature Conservation, Isle of Vilm Germany, 27 February- a March 2001, available: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.470.3940&rep=rep1&type=pdf; accessed 6 Jan 2021

[1030] Gjerde (2018) [365-366], supra note 500. See also R Warner, Marine protected areas beyond national jurisdiction – Existing legal principles and future legal frameworks, in Managing Risks to Biodiversity and the Environment on the High Sea, Including Tools such as Marine Protected Areas—Scientific Requirements and Legal Aspects, Proceedings of the Expert Workshop, H Thiel and JA Koslow (eds) ibid [150]

[1031] Gjerde (2018), supra note 500

[1032] See the workshop proceedings and the inclusion of more recent adoption of such criteria.

[1033] Warner (2001), supra note 1031 [150] and Gjerde (2018) ibid [365-366], supra note 500

[1034] See Figure 6.3 and relevant sections in Part 1 Chapters 1 and 2

fertilisation, synergies and institutional connections that facilitate the sharing of approaches, consistency across separate institutional fora and treaty systems and reciprocal normative influence between them.[1035] The parallel development of the criteria for the identification of sensitive marine area is yet another manifestation that combines different types of synergies between different intergovernmental fora. These include the participation of the same individual experts in different fora,[1036] secretariats of other representative bodies of intergovernmental bodies and international organisations and NGOs being invited as observers or experts in the working group discussions of the intergovernmental bodies working on the development and application of the criteria,[1037] as well as more formal institutional cooperation agreement between bodies. The latter have been developing in the last 10 years.[1038] Similarly, developments in some intergovernmental bodies have been referred to and endorsed by other bodies.[1039]

The technical nature of the criteria and the unity of international law

As observed by several authors, an important feature of the development of these congruent standards may be the technical nature of the decisions that relate to the identification criteria of sensitive marine areas.[1040]

[1035] See Gehring (2008) [9], supra note 994 on normative influence between treaty systems; Romanin Jacur (2016) on the development and influence of international standards in environmental matters, supra note 990; KN Scott (2011) International environmental governance: Managing fragmentation through institutional connection, Melbourne Journal of International law 12: 177-216, on institutional connections between bodies looking at similar issues; Wessel (2016) supra note 999 [181] on the emergence of a global normative web composed of formal and informal as well as connected international norms

[1036] E.g. K Gjerde and J Ardron. See Gjerde (2018) supra note 500

[1037] For example, the advisory and technical support provided by the IUCN to the UNESCO for the designation of world heritage sites of OUV, to the CBD and to Ramsar, as well as the participation of the Ramsar or CMS Secretariats in CBD EBSA identification workshops

[1038] K Scott (2011) elaborates on the diversity of these cooperation mechanisms already developed in 2010, supra note 18. RA Wessel (2016) and FR Jacur (2016) also theorised how these mechanisms can contribute to the development of generally accepted standards with potential normative effect or influential norms; see respectively supra notes 999 and 990

[1039] Although this is not the case in the context of the adoption of scientific criteria for the identification of sensitive areas, examples include the adoption of the 2007 LC/CP COP Statement of concern on ocean fertilization reiterated by the subsequent CBD COP in 2008 and the CBD EIA Guidelines endorsed by the COPs of Ramsar and CMS.

[1040] Authors noting that fewer formal instruments are used for sectoral and technical guidance by IOs (e.g. Johnstone (2013) supra note 996), and may even develop through an interactional process that later reveals the emergence of international norms. See Brunnée (2002), Gehring (2008) and Romanin Jacur (2016), supra notes 990, 994 and 990, respectively

This view is supported by decisions of international courts and tribunals which interpret treaties so as to ensure overall coherence of a treaty, as well as between treaties, and of international law in general. One of the mechanisms used to that effect is the interpretation of provisions of treaties in light of the applicable corpus of international law.[1041] Furthermore, the importance and normative or quasi-normative influence of such technical norms, standards and guidance are also demonstrated in international decisions that emphasise the duty of states to take into account applicable standards that have been adopted after the adoption of the instrument or legal norm being applied.[1042]

This approach may also be seen as a manifestation of the unity of international law that can be read in a principle of integration reflected in article 31(3)(c) of the Vienna Convention on the Law of Treaties,[1043] and the principle of reconciliation relied on by Judge Weeramantry in the context of sustainable development.[1044] This is yet again consistent with the ILC report on the fragmentation of international law which stresses that apparent conflict of norms can be overcome through a sense of coherence and meaningfulness.[1045] The concepts of coherence of

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[1041] For the most recent example, see the SCS Arbitration, Arbitral Award [para 956], supra note 902. Sands also discusses this aim of coherence in other decisions. See P Sands, Sustainable development: Treaty, custom and the cross-fertilization of international law, in International Law and Sustainable Development: Past Achievements and Future Challenges, A Boyle and D Freestone (eds), Oxford University Press, 1999: 38-60 In 2006, Stephens demonstrates, upon examination of the case law, that the fear of fragmentation due to the multiplicity of international dispute resolution institutions for environmental disputes has not led to the serious problems of normative divergence feared by the doctrine. See T Stephens (2006) Multiple international courts and the 'Fragmentation of International Environmental Law', Australian Yearbook of International Law 25: 227-271

[1042] In the case of the Gabcikovo-Nagymaros Project, the Tribunal emphasises the express reference made in Article 297(1)(c) of UNCLOS to 'specified international rules and standards for the protection and preservation of the marine environment', including those established 'through a competent international organization or diplomatic conference' as falling within the jurisdiction of the Tribunal, Gabcikovo-Nagymaros Project (Hungary/Slovakia), Judgement ICJ Reports 1997:7 [para 316]; In the Whaling in the Antarctic case, the Tribunal considers that recommendations of the International Commission on Whaling which have been adopted through resolution and by consensus or unanimous vote are relevant to the interpretation of the convention. It further applies this when deciding that the recommendation on the use of lethal weapons had to be taken into account by Japan; Whaling in the Antarctic (Australia/Japan: New Zealand intervening), Judgement, ICJ Reports 2014: 226 [paras 44-83 and137-144]. Of note, in the Chagos Arbitration case, the Tribunal notes that the reference to "international rules and standards" in Article 297(1)(c) includes the obligation to consult with or give due regard to the rights of other states in addition to substantive rules and standards, Chagos Marine Protected Area Arbitration (Mauritius vs. UK), Award of 18 March 2015 [para 322]

[1043] 1969 Vienna Convention on the Law of Treaties, 23 May 1969, 1155 U.N.T.S. 331 (entered into force 27 January 1980) [VLTC] ; Sands (1999), supra note 1042

[1044] 'Each principle cannot be given free rein, regardless of the other. The law necessarily contains within itself the principle of reconciliation'in Separate Opinion of Judge Weeramantry in the case of the Gabcikovo-Nagymaros Project (Hungary/Slovakia), Judgement ICJ Reports 1997:7 [87]. The context for this statement is the necessary reconciliation of bodies of rules relating to development and those relating to the environment

[1045] M Koskenniemi, Fragmentation of international law: Difficulties arising from the diversification and expansion of international law, Report of the Study Group of the International Law Commission, UNGA A/CN.4/L.282, 2006 [25-25, 253]

international law and application of standards and recommendations is revisited below in the context of the application of UNCLOS. However, before addressing this final point, the importance of the legitimacy of such standards and recommendations for them to be taken into consideration as suggested above is further discussed.

6.1.2.4 State support and legitimacy

This section discusses the level of state support for these congruent criteria and their application and explores whether they could have sufficient legitimacy to qualify as international standards. The question of legitimacy comes up particularly strongly in the context of informal law-making by international organisations that rely on simplified consent-based decision-making and procedures that are expected to generate legal obligations.[1046] Bodansky also highlights that beliefs in legitimacy are arguably more crucial for institutions exercising soft rather than hard power.[1047] Legitimacy in this context describes the concern that a potential new norm is adopted by the relevant political authority, that is one with the right to govern, either as a matter of social normative or sociological legitimacy.[1048]

In the context of this study, the legitimacy being investigated is that of the intergovernmental bodies that adopted and applied the criteria for the identification of sensitive marine areas. Normative legitimacy can be based on the mandate of the intergovernmental bodies, their expertise on the topic, and the intended authority.[1049] Social or descriptive legitimacy is of a more empirical nature, as it relates to the level of acceptability to the decision made, particularly to those to whom it applies, be they area managers or users. It is argued that both the criteria to identify sensitive marine areas and their implementation enjoy strong

[1046] J Brunnée (2002), supra note 991 [9-10]

[1047] Bodansky, Legitimacy in international law and international relations, in Interdisciplinary Perspectives on International Law and International Relations: The State of the Art, JL Dunoff and MA Pollack (eds), 2013, Cambridge University Press: 321-341 [325]

[1048] Ibid [324, 327]

[1049] Ibid [332]

state legitimacy, but the social legitimacy by users may be more debatable.[1050] This view relies on several demonstrations of state support and use of these criteria, regionally and globally.

First, the support from states for the adoption of the criteria to identify sensitive marine areas can be observed through the adoption by consensus of the criteria in all institutional mechanisms.[1051] With respect to identification of areas, designation and/or review by consensus is also applicable in 12 institutional mechanisms.[1052] Three mechanisms applicable in Southeast Asia to identify areas according to the criteria are not submitted to the same adoption procedure, as the states proceed with identification unilaterally.[1053] However, these identifications implement the criteria for identification and in so doing show their *de facto* legitimacy to the state concerned. They also show the shared acceptance by the member states of the criteria and processes adopted.

Quantitative analysis of adoption by states of scientific criteria developed in 12 instruments show that 194 member states have adopted at least two of those instruments, including landlocked states. 80% have adopted five or more of the 12 instruments, bearing in mind that seven of them have a regional scope, with only two in Southeast Asia. (Appendix 8, Table A 8.1) The global and regional level of adoptions across regions of the world shows overall state support for these criteria.

Based on the above, this study argues that the sets of criteria shared across the intergovernmental process and embraced by states through their implementation are emerging as global standards for the identification of ecologically sensitive areas in general and in particular under UNCLOS. The development of these standards and cross- fertilization between sub-regimes and families of instruments also contribute to the emergence

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[1050] Brunnée (2002) also emphasises the importance of the perceived or accepted legitimacy of governance by the civil society and prefers it to a focus on democratic legitimacy designed to address criticisms of the democratic deficit in international governance; supra note 991 [13-14] and Bodansky, ibid [330]

[1051] See sections on the adoption of EBSAs, Ramsar sites, areas of OUV, site network of the IOSEA Marine Turtle and PSSAs, Special Areas under MARPOL and routeing measures in Part 1 Chapters 1 and 2

[1052] EBSAs, Ramsar sites, OUVs, sites network of the IOSEA Marine Turtles, PSSAs, routeing measures, Special Areas under MARPOL, ibid, and the 5 regional seas' mechanisms; see Part 1 Chapter 3 Section 3.4

[1053] EAAFP, ASEAN Heritage Parks and Fisheries Refugia, see Part 1 Chapter 1 Section 1.4.2.6, Sections 1.5.1 and Chapter 2 Section 2.2.3, respectively

of interstitial norms. [1054] The adoption of similar criteria across regimes can be seen as a manifestation of the overall necessity for consistency in international law, and its application in the context of the protection and preservation of the marine environment, including sensitive areas. Such a process of system reconciliation further supports the development and improvement of the global ocean governance framework through the harmonization of networks within the ocean governance complex.[1055]

6.2 Application under UNCLOS

This section examines how the identification criteria, as adopted in different instruments and families of instruments on the protection of the marine environment, apply under UNCLOS. It considers how these criteria fit in the overall global legal framework on the protection and preservation of the marine environment as designed and provided for in UNCLOS.

This discussion is divided into three parts. The first part discusses the implications of the pre-eminence of UNCLOS and its integrative function in the regime complex that governs all activities at sea and the protection of the marine environment. The second part examines the application of the criteria in the context of the implementation of UNCLOS Articles 192 and 194(5). The third part explores potential low-hanging fruits for progress in the context of the SCS.

6.2.1 UNCLOS's structuring and integrative functions

Many papers describe this situation of geographically and substantively overlapping international treaties (both *ratione loci* and *ratione materiae*) and other norms of international law as legal fragmentation in international law.[1056] In the late 90s, this current of literature emphasised differences in the nature of these overlapping treaties, either within a self-

[1054] V Lowe places the development of interstitial norms in the context of the 'system' of international law which has developed over time and, already in 2001, demonstrates their significance and their role as an engine of change in international law. V Lowe, the politics of law making: Are the method and character of norm creation changing? in the Role of Law in International Politics: Essays in International Relations and International Law, M Byers (ed), Oxford University Press, 2001: 207-226

[1055] See Wessel (2016) on the emergence of an institutional global normative web and harmonization networks, supra note 999 [196]

[1056] ILC (2016), supra note 18

contained regimes or independently,[1057] as well as the increased risk of conflicts arising from treaty congestion or proliferation.[1058] However, as previously discussed in the context of the legal status of congruent scientific and technical guidance and standards adopted by intergovernmental meetings, several studies on fragmentation of international law also highlighted that this systemic fragmentation does not necessarily prevent coherence and overall consistency.[1059] This approach is confirmed by decisions of international courts that look for reconciliation rather than conflict resolution.[1060] A further doctrinal current has been developing in the last 20 years that emphasises cross-fertilisation, harmonisation of international law, and even the appearance of a 'global normative network'.[1061]

In this context, this study argues that the processes of reconciliation are even more pronounced in the context of the protection of the marine environment which is provided for in UNCLOS.[1062] As suggested by its best descriptor of 'constitution for the oceans',[1063] and in its preamble, where it is described as the needed 'legal order for the seas and oceans', the pre-eminence of UNCLOS for all issues relating to the oceans, is highlighted by many

[1057] See e.g. W Lang (1992) Diplomacy and international environmental law-making: some observations, Yearbook of International Environmental Law 3: 108-122

[1058] C Redgwell (2000) supra note 1009

[1059] Refer above to the sub-section on mutual supportiveness of the criteria and their application: from fragmentation to convergence to the emergence of new international standards or norms, Chapter 6 Section 6.1.2. On normative influence between treaty systems, see Gehring (2008) [9], supra note 994; on overall coherence of international law, see Sands (1999) and Stephens (2006) supra note 1042 and Koskenniemi (2006) supra note 1046 ; see also the separate opinion of Judge Weeramantry, supra note 1045; on the emergence of international norms, see for example Brunnée (2002), Gehring (2008) and Romanin Jacur (2016), supra notes 990, 994 and 992, respectively

[1060] Sands (1999), supra note 1042; Weeramantry (1997), supra note 1045; Koskenniemi (2006), ibid

[1061] See in particular, Wessel (2016), Romanin Jacur (2016) and Scott (2011), supra notes 999, 990 and 18, respectively

[1062] Law of the sea scholars and practitioners, as well as international public law specialists typically agree that UNCLOS is a unique treaty in many ways and a record in legal history: its comprehensive ambition to regulate all activities at sea (the first such comprehensive treaty since the UN Charter), its open structure and rules of reference to regulation from other competent organisation designed to allow for evolution with future need and understanding, its signature by 119 countries from all regions of the world on the day it was opened for signature, etc. See for example, A Boyle (2005) Further development of the law of the sea convention: Mechanisms for change, The International and Comparative Law Quarterly 54:563-584, T Treves, Law of the Sea, in Max Planck Encyclopaedia of Public International Law, Rüdiger Wolfrum (ed), Oxford University Press, 2011 and Remarks by T Koh, reproduced in UN, The Law of the Sea: Official text of the UNCLOS (United Nations, New York 1983) xxxiii

[1063] This expression appears to have been used first in E Mann Borgese (1977) Constitution for the Oceans: Comments and Suggestions Regarding Part XI of the Informal Composite Negotiating Text, San Diego L. Rev. 15:371; and, famously, in the Remarks by Koh (1983), ibid

commentators.[1064] This view is primarily based on the text of the treaty itself, that is UNCLOS' comprehensiveness (as it aims to regulate all activities at sea),[1065] that it is approaching universality (with 168 parties as of 29 May 2021)[1066] and was designed based on an intertemporal approach.[1067] Furthermore, many of its provisions are commonly referred to as customary international law (regardless of whether they were already so before the entry into force of UNCLOS or have become so since).[1068] UNCLOS' pre-eminence vis-à-vis other treaties is further established in Article 237 of UNCLOS.[1069]

With respect to instruments adopted before UNCLOS, they remain applicable provided that they relate to the protection of the marine environment or were concluded in furtherance of the general principles set forth in [UNCLOS].[1070] As for later treaties, they generally state that they are adopted without prejudice to the rights and obligations defined in UNCLOS, as a means to avoid a conflict of international norms.

Accordingly, Article 22(2) of the CBD provides that:

> Contracting Parties shall implement this Convention with respect to the marine environment consistently with the rights and obligations of states under the Law of the

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[1064] A Boyle compares UNCLOS to the UN Charter: A Boyle (2006) Further Developments of the 1982 Convention on the Law of the Sea, 40-62 in The Law of the Sea: Progress and Prospects, D Freestone et al (eds), 2006, Oxford University Press [43]; See also C Redgwell (2006) From Permission to prohibitions: The 1982 Convention on the Law of the Sea and Protection of the Marine Environment, in The Law of the Sea: Progress and Prospects, D Freestone et al (eds) Oxford University Press (Oxford, 2006)

[1065] The fourth paragraph of UNCLOS' preamble provides: 'Recognizing the desirability of establishing through this Convention, with due regard for the sovereignty of all States, a legal order for the seas and oceans which will facilitate international communication and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment.' See also T Treves (2011) supra note 1063

[1066] Although the United States have not become a party to UNCLOS despite active participation in the negotiations, they consider most of UNCLOS' provisions to be customary international law. See A Roach (2014) Today's Customary International Law of the Sea, Ocean Development and International Law 45: 239-259. For the status of ratification see http://www.un.org/depts/los/reference_files/chronological_lists_of_ratifications.htm; accessed 15 Mar 2022

[1067] A Boyle (2005 and 2006), supra notes 1063 and 1065 and C Redgwell (2006), supra note 1065

[1068] This is the position frequently taken by the USA to justify its compliance with UNCLOS. See for example http://www.unclosdebate.org/argument/855/us-already-abides-unclos-matter-customary-international-law-and-domestic-policy; accessed 15 Mar 2022. See also A Boyle (2006) supra note 1065 and A Roach (2014) supra note 1067

[1069] UNCLOS Article 237 provides that 'Specific obligations assumed by states under special conventions, with respect to the marine environment, should be carried out in a manner consistent with the general principles set forth in this Convention. See also SCS Arbitration, Arbitral Award, supra note 902 [para.942]

[1070] See also UNCLOS Article 237(1)

Sea.

Another key design feature of the ocean governance regime established by UNCLOS which ensures its pre-eminence is its in-built mechanisms that allow sub-regimes to be developed and integrated into UNCLOS. For example, UNCLOS places part of the responsibility to develop and adopt specific measures (including for the protection of the marine environment) on member states acting through competent organizations (such as the IMO for shipping matters and the FAO as well as Regional Fisheries Management Organizations (RFMOs) for fisheries.[1071] Another example of such an in-built mechanism is the rule of reference or the incorporation by reference into UNCLOS of generally accepted rules, standards and recommended practices developed and adopted by competent organizations for various sub-regimes.[1072] Despite being the primary set of rules for all activities on the ocean, UNCLOS is therefore not a separate or self-contained regime.[1073] Integration within the larger system, not fragmentation from it, must necessarily be the starting point.[1074]

Flowing naturally from this, is the approach taken in this study that guidance and standards adopted globally for the identification of sensitive marine areas are implementing UNCLOS obligations to protect the marine environment. The section below discusses how this process of implementation is correct, both as a matter of law and fact (or *de jure* and *de facto*), especially in the context of the implementation of Part XII of UNCLOS and its articles 192 and 194(5).

6.2.2 Applying UNCLOS Articles 192 and 194(5)

6.2.2.1 Articles 192 and 194(5)

The general obligation of states to protect and preserve the marine environment provided in

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[1071] See for example DR Rothwell and T Stephens, The international law of the sea, Hart Publishing, 2010 [344] and C Redgwell (2014) Mind the gap in the GAIRS: The role of other instruments in LOSC regime implementation in the offshore energy sector, The International Journal of Marine and Coastal Law: 600-621. On competent organisations see also JD Kingham and DM McRae (1979) Competent international organizations and the Law of the sea, Marine Policy: 106-132

[1072] On rule of reference, see for example Boyle (2005) supra note 1063, Redgwell (2014) ibid and F Romarin Jacur, Formalism and law making in treaty-based ocean governance: Limits and challenges, in Regime Interaction in Ocean Governance: Problems, Theories and Methods, S Trevisanut, N Giannopoulos and RR Holst (eds), Publications on Ocean Development, Brill Nijhoff, 2020: 156-183

[1073] Boyle (2005) ibid

[1074] Ibid

UNCLOS Article 192, applies to all states that are a party to UNCLOS, both within and beyond their national jurisdiction.[1075] Furthermore, although worded in general term, it imposes a duty on states that are a party.[1076] As described in the SCS Arbitration Award, this 'general obligation' extends both to the 'protection' of the marine environment from future damage and to its 'preservation' in the sense of maintaining or improving its present condition:

> Article 192 thus entails the positive obligation to take active measures to protect and preserve the marine environment, and by logical implication, entails the negative obligation not to degrade the marine environment.[1077]

The content of this obligation is further elaborated in Article 194(5) to include measures that are

> necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.

According to the rules of treaty interpretation, interpretation of the meaning of a treaty must be informed by the other provisions of UNCLOS and other applicable rules of international law at the time of the interpretation.[1078]

6.2.2.2 Article 194(5) in the context of other provisions of UNCLOS

Several provisions provide relevant context to Article 194(5):

(i) Article 192: an overall obligation to protect the marine environment;

Article 194(1): states shall take 'all measures, (…) that are necessary to prevent, reduce, and control pollution of the marine environment from any source' [emphasis added];

[1075] Although this point is not debated, it is reiterated in the arbitral award rendered in the SCS Arbitration, supra note 902 [para 940].

[1076] M/V "Louisa" (Saint Vincent and the Grenadines v. Kingdom of Spain), Provisional Measures, Order of 23 December 2010 [para. 76]; Dispute Concerning Delimitation of the Maritime Boundary Between Ghana and Côte D'Ivoire in the Atlantic Ocean, Provisional Measures, Order of 25 April 2015 [para. 69]

[1077] SCS Arbitration, supra note 902 [para 941]

[1078] Boyle (2006) bases this rule on article 31(c) of the 1969 Vienna Convention on the Law of Treaties and past case law. See supra note 1065. See also the supporting reference to Namibia Advisory Opinion [1971] ICJ Rep 16, 31; Aegean Sea Continental Shelf Case [1978] ICJ Rep 3, 32–33. See also Bankovic v Belgium (2002) 41 ILM 517, paras 55–66; Al-Adsani v UK (2001) 123 ILR 24; Fogarty v UK (2001) 123 Int LR 54; Mc Elhinney v Ireland (2001) 123 Int LR 73. The ICJ's approach, combining both an evolutionary and an intertemporal element, reflects the ILC's commentary to what became Article 31(3)(c). See ILC, 'The law of treaties', commentary to draft Article 27, para (16), in A D Watts (ed), The International Law Commission 1949–1998 (Oxford University Press, Oxford 1999) vol II, 690. More decisions and authors have followed this path since. See for example Romanin Jacur (2020), supra note 1073

(ii) The Preamble which highlights that the problems of oceans are interrelated and need to be considered as a whole, as well as highlighting the conservation of living resources and the study, protection and preservation of the marine environment;

(iii) Articles 204 and 206 on monitoring and environmental assessment: Article 204 on the monitoring of the risks or effects of pollution which mandates states to 'observe, measure, evaluate and analyse, by recognized scientific methods, the risks or effects of pollution of the marine environment', in particular 'keep under surveillance the effects of activities which they permit or in which their engage in order to determine whether these activities are likely to pollute the marine environment'; Article 206 further mandates states to assess and report on the potential effects of their planned activities that may cause substantial pollution of or significant and harmful changes to the marine environment; and,

(iv) The wide result-oriented definition of pollution of the marine environment including the 'direct or indirect introduction by man', 'of substances or energy into the marine environment' which result or are likely to result in 'such deleterious effects as' 'harm to living resources and marine life'.

When considering these provisions together, it seems reasonable to envisage that, in order to fulfil their obligations under Article 194(1) and 194(5), states would have to first seek to identify 'rare or fragile ecosystems' and the 'habitat of depleted, threatened or endangered species and other forms of marine life'. Such an identification would be necessary for them to be able to monitor their ecological status and the risk of pollution, especially as such areas are likely to be more vulnerable to different types of pollution.[1079]

This interpretation is expected to be particularly accurate in the context of the obligation of due diligence of states in the performance of their duty to protect and preserve the marine environment. This concept of due diligence has been progressively defined in successive decisions of

[1079] This common-sense interpretation can be read in comments to the drafting of UNCLOS as early as 1981. See C de Klemm, Living Resources of the Ocean in The Environmental Law of the Sea, DM Johnston (ed), IUCN Environmental Policy and Law paper 18, 1981 [137-138]. Available https://portals.iucn.org/library/sites/library/files/documents/EPLP-018.pdf; accessed 21 Mar 2022

international tribunals and recognised as a principle of international law.[1080] It entails an obligation on the part of states to deploy adequate means and to exercise best possible efforts to protect the marine environment. The content of the obligation therefore varies with the risks involved, which may depend for example, on the sensitivity of an ecosystem or the activity being undertaken. The greater the risk is, the higher the standard of due diligence is expected to be.[1081]

6.2.2.3 Informing article 194(5) with other applicable rules of international law

The application of UNCLOS Articles 192 and Article 194(5) is informed by other applicable rules of international law which, together, form the corpus of international law on the protection of the marine environment, and includes the CBD and CITES.[1082] Other applicable rules of international law that are relevant in this context, are the instruments (governing body resolutions, guidance and recommendations, other than those from the CBD or CITES) adopted in the different regimes studied in Part 1.[1083] Some apply globally, the geographic scope of others is limited to a specific region. The applicability of another instrument in this context, according to the principle of systemic integration, would depend on the extent of its adoption by the states concerned and whether it can be seen as globally accepted.[1084] Given the integrating principle of protection and preservation of the marine environment, UNCLOS Article 311(2) which provides that it 'should alter the rights and obligations of state parties which arise from other agreements compatible from this Convention' is fully consistent with this approach.

Ecosystem is defined in the CBD as

> a dynamic complex of plant, animal and micro-organism communities and their non-

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[1080] For a summary of the development of this concept, see Y Lyons et al (2018) Managing giant clams in the SCS, The International Journal of Marine and Coastal Law 33: 467-494 [477-480]. See also ITLOS Case N 17 – Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, Advisory Opinion, 1 February 2011

[1081] D French and T Stephens, International Law Association Study Group on Due Diligence in International Law, First Report, 7 March 2014 [29]

[1082] SCS Arbitration Award, supra note 902 [paras 941, 945 and 956]

[1083] The idea that global and regional treaties and instruments devoted to the protection of the marine environment would 'give expression' to UNCLOS Article 194(5) and implement it by deliberate choice and design dates back to the time of the negotiation and early entry into force of the convention. See for example IUCN, The Law of the Sea: Priorities and Responsibilities in Implementing the Convention, Part I LA Kimball, UNCLOS: A framework for marine conservation, Part II DM Johnston, PM Saunders and P Payayo, Conservation and management of the marine environment, IUCN, Gland, 1995 [85, 92-93]

[1084] Boyle (2005), supra note 1063, C Kojima (2015) SCS Arbitration and the Protection of the Marine Environment: Evolution of UNCLOS Part XII Through Interpretation and the Duty to Cooperate, Asian Yearbook of International Law 21: 166-180

living environment interacting as a functional unit.[1085]

Habitat is also defined in the CBD as

the place or type of site where an organism or population naturally occurs.[1086]

However, 'species' is not defined in the CBD or other international treaties. In biology and ecology, 'species' designates the overall fundamental unit of the taxonomic system. However, specific definitions depend on the field of application.[1087] Nevertheless, lists of species included in the scope of the treaties are found in Appendices to CITES[1088] and CMS,[1089] according to the procedure of adoption set out in each treaty. This identification of endangered and threatened species is therefore binding under international law.[1090]

By contrast, determination of species status in the IUCN Red List does not form part of the body international law. However, it provides authoritative expert evidence which would be taken into account by intergovernmental meetings and tribunals;[1091] an example would be a discussion on the status of a species which is disputed and not listed in any of CITES Appendices. Expert evidence can also be used to complement the species status provided by CITES Appendices, in the context of the application of UNCLOS Articles 192 and 194(5).[1092]

6.2.2.4 Article 194(5) and protected areas: a unanimous view

Before discussing further the interpretation and application of UNCLOS Article 194(5)

[1085] CBD Article 2

[1086] CBD Article 2

[1087] According to the biological species concept, the species is a group of natural populations whose members can all breed together to produce offspring that are fully fertile, but that in the wild do not do so with other such groups. By contrast, the ecological species concept designates a group of natural populations whose members all possess a set of characteristics (morphological, behavioural, physiological, etc.) that adapt it to a particular ecological niche. See CB Cox and PD Moore, Biogeography, An ecological and evolutionary approach, 8th Edition, John Wiley and Sons, 2010 [481]

[1088] Supra Part 1 Chapter 1 Section 1.4.2.2 and Chapter 3 Section 3.1.4, as well as Appendix A Table A1 of CMS- and CITES-listed species that occur in the SCS

[1089] Supra Part 1 Chapter 1 Section 1.4.6 and Appendix A Table A1, ibid

[1090] SCS Arbitration, supra note 902 [956-957]

[1091] Ibid [823]

[1092] Ibid [957]

To sensitive area criteria, the drafting history of this provision requires consideration to determine potential differences in intentions or understanding of this provision during the text negotiation. However, unlike other provisions of UNCLOS Part XII that underwent tight negotiations and re-drafting, this provision seems to have appeared suddenly in 1978 following a proposal from the United States of a new (5th) paragraph to the draft article 194, with the following text:[1093]

> The measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other *[forms]* marine life.

This initial text appears to have reached consensus straight away (with only one dissenting voice at that meeting) and the text was retained afterwards, with the only addition of the word 'form'.[1094]

Article 194(5) is typically referred to by legal scholars and intergovernmental organisations as the provision of UNCLOS that envisages general area-based conservation measures under these instruments.[1095] Another express provision of UNCLOS on protected areas or area-based protective measures which is often referred to is UNCLOS Articles 211(6). This article provides the legal ground for coastal states to adopt special protective measures against shipping activities to protect in 'clearly defined area' if applicable international rules and standards are inadequate to meet the special circumstances of this area.[1096]

In their commentary on the provisions of UNCLOS, Nordquist et al consider that Article 194(5) is self-explanatory as it extends the concept of protection and preservation of the marine environment to 'rare of fragile ecosystems' and the 'habitat of depleted, threatened or

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[1093] At the seventh session of the Third United Nations Conference on Law of the Sea 1973-1982 (UNCLOS III)Document A/CONF.62/C.3/SR.38, 39th meeting of the Third Committee, Extract from the Official Records of the Third United Nations Conference on the Law of the Sea, Volume IX, Seventh and Resumed Seventh Session [para 6]. Available https://legal.un.org/diplomaticconferences/1973_los/docs/english/vol_9/a_conf62_c3_sr38.pdf; accessed 11 February 2021

[1094] Ibid para 34 and 84. According to the summary record, the only reservation (expressed by Spain) was not reiterated in the subsequent 101st Plenary Meeting where the revised informal composite negotiating text (MP/24) that included this new provision was presented. See A/CONF.62/SR.101. Available https://legal.un.org/diplomaticconferences/1973_los/docs/english/vol_9/a_conf62_sr101.pdf; accessed 11 February 2021. The first revision of the informal composite negotiating text that includes this new addition is also available https://legal.un.org/diplomaticconferences/1973_los/docs/english/vol_8/a_conf62_wp10_rev1.pdf; accessed 11 February 2021

[1095] C de Klemm (1981) supra note 1080 and United nations Convention on the Law of the Sea: A Commentary, A Proelss (ed),CH Beck, Hart, Nomo, 2017 provide a sound representation of the overriding understanding of the doctrine that article 194(5) provides a key legal basis for protected areas.

[1096] See Roberts (2005) supra note 453 and the corresponding section in Part 1 Chapter 2 Section 2.1.3 section

endangered species and other forms of marine life'.[1097] They also consider that UNCLOS Article 234 on the protection of ice-covered areas is another example of protective powers being granted to a fragile area. The very large protective mandate given to the ISA in UNCLOS Article 145 in the context of mining in the Area, is also an example. It is unfortunate that it has taken so long for this clear provision and straight-forward understanding, which is confirmed by the systemic interpretation undertaken by several international courts,[1098] to impose itself,[1099] as if it demanded a paradigm shift to be seen.

In light of the definition of ecosystems and habitats in the CBD,[1100] Article 194(5) aims to protect both living and non-living components of the marine environment that are necessary for the protection of a fragile or rare ecosystem or the species under threat.[1101] However, the meaning of 'rare', 'fragile', 'depleted', 'threatened' or 'endangered' is not included in the text of the CBD. Based on the principle of interpretation of international law in light of the applicable body of international law at the time of the interpretation, the understanding that results from the Reference Criteria Set, which has been developed in Part I, can be useful.[1102]

6.2.2.5 The potential role of the Reference Criteria Set under UNCLOS

Of the 10 ecological criteria considered in Part 1, three use the same language (underlined) as that of Article 194(5):

- Criterion 1 on uniqueness, rarity or distinctiveness of species, populations, communities, habitats, ecosystems, etc;
- Criterion 3 on threatened or endangered or declining species or habitats; and
- Criterion 4 on vulnerability, fragility, sensitivity and slow recovery. [1103]

As previously demonstrated, these three criteria are among the most common of all the

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[1097] See A Commentary, United Nations Convention on the Law of the Sea 1982, Volume 5, MH Nordquist, S Rosenne and LB Sohn (eds), 1989 [68]

[1098] Supra previous sub-section and its footnotes

[1099] Several scholars saw this provision as too general to have teeth. See for example, EJ Goodwin, International environmental law and the conservation of coral reefs, Routledge Research in Environmental Law, Routledge, London, 2011 [67]

[1100] See subsection 6.2.2.3 above on the application of other rules of international law to Article 194(5)

[1101] Proelss (2017) supra note 1096

[1102] Refer to Part 1 Chapter 3

[1103] See above Part 1 Chapter 3 Section 3.1.2

families of global and regional instruments analysed in this study.[1104] The definition used for each criterion in the different instruments that use it is consistent across the instruments.[1105]

All three can also support the implementation of Article 194(5). However, although the definition of these criteria has been clarified and elaborated on under international law, in resolutions of the relevant bodies, only endangered species have been clearly identified and listed in binding treaties and their appendices. The others have been clarified in legally non-binding instruments, although their normative power is argued in this study.

The absence of a 'binding' definition may be particularly relevant in the context of transboundary marine ecosystems and shared resources where domestic regulations may be different and therefore may undermine the efforts of any one state trying to protect this ecosystem or resource.[1106] Implementation may therefore be relatively easier with respect to species that are listed as endangered under a binding legal instrument. This would include the identification of the habitat and the ecosystem that those species depend on.

Justification that a particular species, habitat or ecosystem meet criteria 1 and 3 may require building a file with the supporting scientific evidence. Of note, this may be notably easier in regional seas where regional mechanisms are put in place to identify such species, ecosystems and habitats.

Nevertheless, sensitive marine areas that meet the three criteria above may all fall within the scope of UNCLOS Article 194(5). In addition, other criteria of the reference criteria set can also be connected with these three criteria: C2- special importance for life history of species and C10- Refugia as they seek to identify habitats of particular importance to the survival of species or ecosystems.[1107] C2 may include any critical life-history stage of a species, such as areas used as breeding grounds, spawning/nursery areas, juvenile habitats, etc. It therefore overlaps with criterion C3 and the scope of Article 194(5) with respect to the habitat of depleted, threatened or endangered species. Similarly, areas identified in the basis of C10 which focuses on identifying sites resistant and resilient to stressors and that can act as a refuge from current and future stresses, especially from climate change, may also qualify under C3 as well as Article 194(5) for sites that are necessary to the survival of depleted, threatened or endangered species.

[1104] See above Part 1 Chapter 3, Tables 3.1 and 3.2

[1105] Ibid

[1106] This is the ground for both UNCLOS Article 123 on the cooperation of states for the protection of the marine environment and resources in enclosed or semi-enclosed seas and Article 197 on regional cooperation for the protection of the marine environment

[1107] See above Part 1 Chapter 3 Section 3.1.2

Several parameters may influence the decision of states to select an area for identification as a sensitive area and decide on adequate particular measures for the area. These may include ecological, political, economic, scientific and social factors. That an area has not been identified, although it needs recognition and protection, could also result from the lack of scientific data in this area. Areas which may not be identified under any of the instruments highlighted in Part 1 might therefore still potentially qualify under Article 194(5). These observations aside, it is certain that had Article 194(5) been properly implemented since the entry into force of UNCLOS in 1994, the overall biodiversity, productivity and resilience of marine ecosystems and the state of living resources would be in a different and far better place.

With respect to sensitive marine areas identified on the basis of other criteria than these five criteria (C1, C2, C3, C4 and C10), it seems more difficult to argue that they may qualify for protection and preservation measures under UNCLOS Article 194(5). These are: C5- biological productivity, C6- biological diversity, C7- naturalness, C8- representativity and C9- connectivity. However, these five criteria provide a mechanism to identify sites that contribute to functioning marine ecosystems and may therefore need particular protection or management measures, without being related to fragile or rare ecosystems or depleted, threatened or endangered species. As such they may provide useful implementation criteria for the implementation of other general provisions of UNCLOS that are relevant to sensitive marine areas: UNCLOS Article 192 in general as well as Articles 204 and 206 of UNCLOS on the monitoring of and assessment of adverse impacts from human activities.[1108]

6.2.2.6 A hierarchy of sensitive marine areas under UNCLOS?

This section envisages the possibility of a *de facto* legal hierarchy in the application of the criteria from the Reference Criteria Set for the application of sensitivity criteria under UNCLOS. This idea of a hierarchy results from (i) some criteria are based on the direct

[1108] Articles 204 to 206 form section 4 of UNCLOS Part XII, entitled 'monitoring and environmental assessment'. When read in the context of states obligation to act with due diligence in the fulfilment of their obligation to protect and preserve the marine environment (see supra Part 2 Chapter 6 Section 6.2.2.2), characteristics of sensitivity that may not fit within the direct scope of application of UNCLOS Article 194(5) may still be relevant in the assessment of the standard of states' obligation of due diligence (for example C6 on biological diversity and C7 on naturalness).

application of binding treaties (such as a substantive provision of UNCLOS[1109] and a characterisation of threat under CITES); and (ii) the difficulty and uncertainty in what would be satisfactory evidence to establish that a criterion is met under the obligations set in UNCLOS Articles 194, or 204 to 206 and having these provisions applied and fulfilled.[1110]

Based on this observation, the former analysis of the application of UNCLOS to areas that would be identified according to one or several criteria of the Reference Criteria Set, suggests that four types of situations may be envisaged:

1. Cumulative application of UNCLOS and CITES or CMS for the protection of endangered species: This would concern marine areas that meet Criterion 3-Threatened, endangered or depleted species of the Reference Criteria Set, for a species recognised by a binding instrument and which is depleted, threatened or endangered and therefore fits within the scope of Article 194(5).
2. Cumulative application of UNCLOS and binding instruments that identify sensitive areas that fall within the scope of Article 194(5) but not (1) above: An example would be a transboundary RAMSAR Wetland where one of the species critical to the designation of the site is the subject of insufficient protection by one of the bordering states.
3. Areas or species that have been identified according to criteria C1, C3 and C4 that fit within Article 194(5) but have not been acknowledged in a binding instrument
4. Areas that did not fit into any above category or meet criteria C2, or C4 to C10.

Two important caveats need to be added to this theoretical approach. First, this discussion of the relevance and applicability of UNCLOS to the Reference Criteria Set derived from other

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[1109] This refers to the fact that although UNCLOS is recognized as including both framework provisions and substantive provisions, Article 194(5) has been recognized as a substantive provision that can be directly applicable. On this distinction, see R Churchill, the 1982 United Nations Convention on the Law of the Sea, in The Oxford Handbook of the Law of the Sea, D Rothwell, A Oude Elferink, K Scott and T Stephens (eds), Oxford University Press, 2015: 24-45; On Article 194(5) being a directly applicable provision, see Freestone (1996), supra note 143, and L Korseberg (2018) The law-making effects of the FAO deep-sea fisheries guidelines, ICLQ 67: 801-832 [814]. See also, decisions from international courts such as the arbitral award rendered in the SCS Arbitration (supra note 902) and ITLOS
2015 provisional order in Ghana/Côte d'Ivoire, that applies directly to states several provisions of Part XII including Articles 192 and 193, Delimitation of the Maritime Boundary in the Atlantic Ocean (Ghana/Côte d'Ivoire), Provisional Measures, Order 25 April 2015 [paras 69-70]

[1110] There is limited case law from international courts on which to base such an assessment. Furthermore, international judges have discretionary powers in their assessment of the facts presented to them. This prerogative is essential to judges who assess the merits of claims in fact and in law and render decisions that are final and binding between the parties for the claims they are adjudicating. Until a similar set of circumstances has been judged, it can be difficult to convince states of the content of their obligation. On the influence of court decisions, see Romanin Jacur supra note 990

international instruments does not include the discussion on measures that may be expected from states. This would depend on the activities that have been and are being undertaken in this area, the nature of the potential or actual environmental risk and the rules of international law applicable in this area. This is a different and large discussion excluded from the scope of this research in order to focus on the scientific and technical criteria that are not the subject of much attention under international law. However, it would be the next relevant question to examine to explore how these criteria could be used in practice and answer the next 'so-what?' question.

Second, this approach may be more fruitful in regional seas and with respect to shared marine ecosystems and resources. Although UNCLOS Articles 194(5) and 204 to 206 apply in all maritime zones, transboundary cases lend themselves better to invoking the application of UNCLOS in international law and policy discussions. Unilateral domestic law and policy cannot be sufficient on their own in these cases.

6.2.3 Low-hanging fruits in the SCS: Protecting the habitat of endangered and threatened species and their habitats under CITES and the CMS

Chapter 5 above shows that the political tensions linked to the sovereignty and marine delimitation of the Spratly seamounts are a challenge to the identification of these seamounts, or a subsection of these, as a sensitive area under one of the applicable instruments.

However, based on the published and (mostly) peer-reviewed scientific literature, and despite some scientific gaps, it seems that the three main criteria that fall within the scope of Article 194(5) can be substantiated in the Spratly seamounts. This means that despite the tensions, scientific literature from all coastal states has developed and provides support for the application of UNCLOS.

Furthermore, based on the prior analysis in section 6.2.2 that identifies areas and species that would have been identified as threatened or endangered in a binding treaty as low-hanging fruits for the application of UNCLOS Article 194(5), this study argues that these point to an avenue for further development. Such a development would focus on considering the available science and the species identified as endangered or threatened under international law to support the application of UNCLOS.

CITES is particularly relevant in this context, as it has been adopted by all the coastal states of

the SCS. The marine species and taxa listed in CITES that have records in the SCS are compiled in Appendix 9. They encompass more than 100 species. Importantly, many are also included in the CMS appendices and the species' specific instruments. This again shows the general consistency of these instruments and their congruence. The animal species that are listed include species of marine mammals, sea turtles, sharks and rays, seabirds and shorebirds, fish, seahorse, sea cucumber, giant clam, nautilus and soft and hard corals.

However, the missing piece in this information to justify the application of Article 194(5) is now to identify the areas, or critical habitats, that these species need in the SCS to survive. These areas may include those already identified under the applicable instruments. The limited coverage of such areas in the SCS suggests that many other areas need identifying that have not been identified yet under international instruments. The hope is that linking this habitat identification with the application of Article 194(5) would provide a new path for both independent and concerted action by interested coastal states, including in discussions on a Code of Conduct.

Conclusion and prospective reflections on the identification of sensitive marine areas and on the interface of law and science in the implementation of international law

This research study highlighted the legal relevance of the technical and scientific criteria adopted around the world for the identification of sensitive marine areas due to the legal and institutional context in which they were adopted. It conducted an analysis of facts and law to explore their legal status and implementation. This analysis of facts, verified according to sound science and applicable international law, led to the formulation of a new legal proposal that these criteria may be shaping the emergence of new ecological standards for the identification of sensitive marine areas under international law that may be applicable in the SCS and beyond.

To reach this conclusion, in Part 1, Chapters 1 and 2 first identified all the relevant instruments and sets of criteria adopted by intergovernmental meetings at international and regional levels that may be applicable to the identification of sensitive marine areas in the SCS. This included the examination and comparison of 20 instruments and 15 sets of scientific and technical criteria prior to the development of a unified set of 10 ecological criteria and 7 non-ecological criteria in Chapter 3. This unified Reference Criteria Set is based on the congruence of the objectives pursued by these criteria, on the language they use, on the overlap in application, and on their overall consistency.

This analysis envisaged a Reference Criteria Set that groups them all together. Subsequent comparison with the instruments and criteria adopted in four other regional seas confirmed the proposition that the ecological criteria of the Reference Criteria Set proposed provides a comprehensive and accurate description of generally accepted criteria for the identification of sensitive areas and that it encompasses all of them. These are:

(C1) - Uniqueness or rarity;
(C2) - Special importance for life history of species;
(C3) - Threatened or endangered or declining species or habitats;
(C4) - Vulnerability, fragility, sensitivity, slow recovery;
(C5) -Biological productivity;
(C6) - Biological diversity;
(C7) – Naturalness;

(C8) – Representativity;

(C9) – Connectivity; and,

(C10) - Refugia or site resistance or resilience.

However, the comparison between the non-ecological criteria of the Reference Criteria Set and the other sets of criteria showed that, even if some of them were reflected in some sets of criteria, there was no clear trend of general adoption in the context of sets of criteria for the identification of sensitive areas.

Prior to investigating the availability of peer-reviewed scientific data to apply the Reference Criteria Sea, the first chapter of Part 2 (Chapter 4) examined state practice in Southeast Asia on the application of the scientific criteria adopted under different instruments. This involved 94 regional sensitive areas. First, the investigation focused on areas identified under several instruments, including the criteria met for each. Second, it examined whether 'overlapping' identifications in the same area would involve the same association of types of sensitive marine areas. This primarily showed the prevalent overlap of identifications, such as an EBSA and a Ramsar wetland of international importance, and general consistency in the use of criteria. However, some inconsistencies also demonstrated the need to identify processes to overcome the fragmentation in these processes. A regional repository might be a useful step. The overall conclusion of this Chapter 4 demonstrated a widespread regional state practice for the application of five ecological criteria: 1) uniqueness, 2) life history, 3) endangered species and ecosystems, 4) vulnerability and 5) biodiversity.

Chapter 5 found that despite the absence of any sensitive area identified in the Spratly area under international and regional instruments, there is ample scientific evidence that seven of the ten ecological criteria are met, at medium or high level, when one or two are generally sufficient under the instruments. The data gaps did not prevent application of several criteria in a satisfactory manner, when compared with practice by the relevant bodies. With respect to non-ecological criteria, this lack of a trend identified in the design of the Reference Criteria Set was further confirmed when considering application in Southeast Asia. Data gaps further made their application difficult.

Chapter 6, which investigated the legal status of the technical and scientific criteria considered as a whole, as informal law-making, and in the context of UNCLOS, found that these criteria may be shaping globally accepted standards for the identification of sensitive marine areas under UNCLOS. This proposal is based on the following steps in the reasoning and the analysis. First,

the process of identification of sensitive areas under the auspices of intergovernmental bodies were analysed as a progressive development of norms through international cooperation along a continuum of cooperation between political discussion and normative commitments. Second, it was found that several of these identifications have normative effects under the parent instruments, despite them being conducted according to a series of non-binding decisions of the bodies. Third, a detailed analysis of the state practice in the application of criteria demonstrated their congruence and mutual supportiveness on several grounds, thereby supporting the emergence of new standards.

When considering these in the context of the implementation of UNCLOS and the obligation of states to exercise due diligence in the fulfilment of their obligation to protect and preserve the marine environment, as developed by international courts and arbitral tribunals, these criteria take on new roles and legal status as they inform the standard of the obligation of due diligence. It is proposed that one application of these new standards, and perhaps the easiest at this stage, would be to use criteria that can substantiate the application of UNCLOS Article 194(5) and apply instruments that have identified rare or fragile ecosystems or the habitat of depleted, threatened, or endangered species. Such an approach would be based on species identified as threatened or endangered under CITES and CMS, the habitat of which has been identified under other instruments and the scientific literature.

Returning to the SCS, the political tensions linked to disagreement on sovereignty over offshore features in the SCS and related maritime boundary disputes will continue complicating cooperation for the joint management of shared ecosystems and resources and in the SCS and challenging the implementation of international law. However, the approach of the Reference Criteria Set proposed in this research focuses on the application of pre-screening criteria for the identification of sensitive areas, ahead of identification and determination of management measures that may be the most useful. Should the data be compiled to substantiate further the application of Article 194(5) in specified parts of the SCS (including the Spratly seamounts), states may be in a position to unilaterally control activities under their jurisdiction and control accordingly.

Last but not least, an important challenge is to develop a case of compelling scientific evidence that will support either the application of Article 194(5) or the application of particular care in the context of the obligation of due diligence. Epistemic communities on international law and marine sciences are not as convergent as the criteria examined in this research. The need to

bridge the divide is a recurring topic of marine policy.[1111] And it is a prerequisite to the implementation of UNCLOS Article 194(5). If the international community continues to disregard this provision, the future for the resilience and good environmental status of biodiversity, productivity and the marine environment in general is not promising.

[1111] An illustration of this need is discussed by P Verlaan in P Verlaan, The Interface of Science and the Law, in Frontiers in International Environmental Law: Oceans and Climate Challenges – Essay in Honour of David Freestone, R Barnes and R Long (Eds), Brill, 2021: 409-429

Appendix

Appendix A: CMS- and CITES- listed species that occur in the SCS

The tables below include all the species listed in Appendices I and II of the Convention on Migratory Species that are known to be found in the SCS marine or coastal areas. Identification of the relevant species is based on both the Range States indicated on CMS Assessment Information and the IUCN Red List database. For shorebirds and seabirds, references and findings of the CBD Regional Workshop to Facilitate the Description of EBSAs in the Seas of East Asia were also used. Therefore, it is possible that species were omitted if no SCS Range State were identified on the CMS platform or if the IUCN database did not mention this area due to a lack of data although the species may be found in the SCS. Data scarcity can also be a cause of discrepancies between the CMS and IUCN Red List databases.

This Table also includes the listing status of these species under CITES, for the purpose of the discussion in Chapter 6 of the manuscript.

Table A1: CMS- and CITES-listed species in the SCS

Higher Taxa category	Common Family Name	Common Name	Scientific Name	CITES			CMS*		
				App I	App II	App III	App I	App II	Agreement or MoU**
Whales / Cetacean	**Cetacea**	**Cetacea**	**Cetacea spp**		X				
	Baleen Whale	Sei Whale	*Balaenoptera borealis*	X			X	X	ACCOBAMS and Pacific Islands Cetaceans
	Baleen Whale	Bryde's whale	*Balaenoptera edeni*	X			-	X	Pacific Islands Cetaceans
	Baleen Whale	Blue Whale	*Balaenoptera musculus*	X			X	-	ACCOBAMS and Pacific Islands Cetaceans
	Baleen Whale	Omura's whale	*Balaenoptera omurai*	X			-	X	-
	Baleen Whale	Fin Whale	*Balaenoptera physalus*	X			X	X	ACCOBAMS and Pacific Islands Cetaceans
	Toothed Whale	Humpback Whale[c]	*Megaptera novaeangliae*	X			X	-	ACCOBAMS and Pacific Islands Cetaceans
	Toothed Whale	Killer whale	*Orcinus orca*		X		-	X	Pacific Island Cetaceans, Western African Aquatic Mammals, ACCOBAMS and ASCOBANS
	Toothed Whale	Sperm Whale[a]	*Physeter macrocephalus*	X			X	X	-
	Dolphins	Irrawaddy Dolphin[b]	*Orcaella brevirostris*	X			X	X	Pacific Islands Cetaceans

Higher Taxa category	Common Family Name	Common Name	Scientific Name	CITES			CMS*		
				App I	App II	App III	App I	App II	Agreement or MoU**
	Dolphin	Indo-Pacific humpback dolphin	*Sousa chinensis*	X			-	X	Pacific Island Cetaceans
	Dolphin	Pantropical spotted dolphin	*Stenella attenuata*		X		-	X	Pacific Island Cetaceans and Western African Aquatic Mammals
	Dolphin	Spinner dolphin	*Stenella longirostris*		X		-	X	Pacific Island Cetaceans and Western African Aquatic Mammals
	Dolphin	Fraser's dolphin	*Lagenodelphis hosei*		X		-	X	Pacific Island Cetaceans and Western African Aquatic Mammals
	Porpoise	Indo-Pacific Finless porpoise	*Neophocaena phocaenoides*	X			-	X	Pacific Island Cetaceans
	Dugong	Dugong	*Dugong dugon*	X			-	X	Dugong MOU (2007)
Sea Turtles	Sea turtles	Green turtle	*Chelonia mydas*	X			X	X	IOSEA Marine Turtles and Atlantic Turtles
	Sea turtles	Loggerhead turtle	*Caretta caretta*	X			X	X	IOSEA Marine Turtles and Atlantic Turtles
	Sea turtles	Hawksbill turtle	*Eretmochelys imbricata*	X			X	X	IOSEA Marine Turtles and Atlantic Turtles
	Sea turtles	Olive Ridley turtle	*Lepidochelys olivacea*	X			X	X	IOSEA Marine Turtles and Atlantic Turtles
	Sea turtles	Leatherback turtle	*Dermochelys coriacea*	X			X	X	IOSEA Marine Turtles and Atlantic Turtles
Sharks and Rays	Shark	Silky shark	*Carcharhinus falciformis*		X		-	X	Sharks MOU (2016)
	Shark	Oceanic whitetip shark	*Carcharhinus longimanus*		X				
	Shark	Scalloped hammerhead shark	*Sphyrna lewini*		X		-	X	Sharks MOU (2016)
	Shark	Great hammerhead shark	*Sphyrna mokarran*		X		-	X	Sharks MOU (2016)
	Shark	Smooth hammerhead shark	*Sphyrna zygaena*		X			X	Sharks MOU (2016)
	Shark	Thresher shark	*Alopias spp*		X				
	Shark	Pelagic tresher shark	*Alopias pelagicus*		X		-	X	Sharks MOU (2016)
	Shark	Bigeye tresher shark	*Alopias superciliosus*		X		-	X	Sharks MOU (2016)
	Shark	Common tresher shark	*Alopias vulpinus*		X		-	X	Sharks MOU (2016)
	Shark	Basking shark	*Cetorhinus maximus*		X		X	X	Shark MOU (2010)
	Shark	Great white shark	*Carcharodon carcharias*		X		X	X	Shark MOU (2010)
	Shark	Shortfin mako	*Isurus oxyrinchus*		X		-	X	Sharks MOU (2010)
	Shark	Longfin Mako	*Isurus paucus*		X		-	X	Sharks MOU (2010)
	Shark	Spiny dogfish	*Squalus acanthias*		-		-	X	Sharks MOU (2010)

Higher Taxa category	Common Family Name	Common Name	Scientific Name	CITES			CMS*		
				App I	App II	App III	App I	App II	Agreement or MoU**
	Shark	Whale shark[b]	*Rhincodon Typus*		X		-	X	Sharks MOU (2010)
	Manta ray	Manta ray[a]	*Manta spp*		X				
	Manta ray	Reef manta ray	*Manta alfredi*		X		X	X	Sharks (2016)
	Manta ray	Giant manta ray	*Manta birostris*		X		X	X	Sharks (2016)
			Mobula spp[b]		X				
	Manta ray	Japanese devil ray	*Mobula japanica*		X		X	X	Sharks (2016)
	Manta ray	Bentfin devil reay	*Mobula thurstoni*		X		X	X	Sharks (2016)
	Manta ray	Sickle fin devil ray	*Mobula tarapacana*		X		X	X	Sharks (2016)
	Manta ray	Longhorned pigmy devil ray	*Mobula eregoodootenkee*		X		X	X	Sharks (2016)
	Manta ray	Shortfin devil ray	*Mobula Kuhlii*		X		X	X	Sharks (2016)
			Pristidae spp	X					
	Manta ray	Narrow sawfish	*Anoxypristis cuspidata*	X			X	X	Sharks (2016)
	Manta ray	Dwarf sawfish	*Pristis Clavata*	X			X	X	Sharks (2016)
	Manta ray	Green sawfish	*Pristis Zijsron*	X			X	X	Sharks (2016)
	Manta ray	Largetooth sawfish	*Pristis pristis*	X			X	X	Sharks (2016)
	Wedgefish	Wedgefish	Rhinidae spp[b]		X				
	Wedgefish	Bottlenose (white-spotted) wedgefish	*Rhynchobatus australiae*						
	Wedgefish	Giant guitarfish	*Glaucostegus typus*		X				
	Wedgefish	Clubnose guitasfish	*Glaucostegus thouin*		X				
	Wedgefish	Widenose guitasfish	*Glaucostegus obtusus*		X				
Seabirds	Shore-/seabirds	Relict gull	*Larus relictus*	X			X	-	-
	Shore-/seabirds	Eurasian curlew	*Numenius arquata*	-			-	X	AEWA
	Shore-/seabirds	Far Eastern curlew	*Numenius madagascariensis*	-			X	X	-
	Shore-/seabirds	Whimbrel	*Numenius phaeopus*	-			-	X	AEWA
	Shore-/seabirds	Nordmann's greenshank	*Tringa guttifer*	X			X	X	-
	Shore-/seabirds	Common greenshank	*Tringa nebularia[xviii]**	-			-	X	AEWA
	Shore-/seabirds	Wood sandpiper	*Tringa glareola[xix]**	-			-	X	AEWA
	Shore-/seabirds	Black-faced spoonbill	*Platalea minor[viii]*	-			X	-	-
	Shore-/seabirds	Christmas Fregatebird	*Fregata andrewsi*	X					
	Shore-/seabirds	Sanderling	*Calidris alba*	-			-	X	AEWA
	Shore-	Great Knot	*Calidris tenuirostris*	-			X	X	AEWA

Higher Taxa category	Common Family Name	Common Name	Scientific Name	CITES			CMS*		
				App I	App II	App III	App I	App II	Agreement or MoU**
	/seabirds								
	Shore-/seabirds	Spoon-billed sandpiper	*Calidris Pygmaea*	-			X	X	-
	Shore-/seabirds	Saunders' gull	*Saundersilarus saundersi*	-			X	-	-
	Shore-/seabirds	Chinese crested tern	*Thalasseus bernsteini*	-			X	-	-
	Shore-/seabirds	Chinese egret	*Egretta eulophotes*	-			X	-	-
	Shore-/seabirds	Ruddy turnstone	*Arenaria interpres*	-			-	X	AEWA
	Shore-/seabirds	Lesser sandplover	*Charadrius mongolus*	-			-	X	-
	Shore-/seabirds	Greater sandplover	*Charadriusleschenaultii*	-			-	X	AEWA
	Shore-/seabirds	Bar-tailed godwit	*Limosa lapponica*	-			-	X	AEWA
	Shore-/seabirds	Black-tailed godwit	*Limosa limosa*	-			-	X	AEWA
	Shore-/seabirds	Grey plover	*Pluvalis squatarola*	-			-	X	AEWA
	Shore-/seabirds	Broad-billed sandpiper	*Limicola falcinellus*	-			-	X	AEWA
Fish	Finned fish	Humphead wrasse	*Cheilinus undulatus*		X				
Seahorse	Seahorse	Seahorse	*Hippocampus spp.*		X				
Sea cucumber	Sea cucumber	White teatfish	*Holothuria fuscogilva*		X				
	Sea cucumber	The black teatfish	*Holothuria nobilis*		X				
Mollusca	Giant clam	Giant clam	*Tridacna spp*		X				
			Tridacna gigas		X				
			Tridacna maxima		X				
			Tridacna noae		X				
			Tridacna squamosa		X				
			Hippopus hippopus		X				
	Nautilus	Nautilus	*Nautilidae spp*		X				
Corals	Corals	Black coral	*Antipatharia spp*		X				
		Blue coral	*Heliopora coerulea*		X				
		stony coral	*Scleractinia spp*		X				
		Organ-pipe corals	*Tubiporidae spp.*		X				
		Fire coral	*Milleporidae spp.*		X				
		Lace coral	*Stylasteridae spp.*		X				

*CMS Range States in the SCS include Brunei, Cambodia, China, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. They are also the littoral states in the SCS (including the GOT).

** When a Concerted Action has been adopted for a species, the year of adoption by the COP is mentioned by [a] or [b] after the species names and as indicated below

[a] Concerted Action COP 12 (2017)

[b] Concerted Action COP 13 (2020)

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Appendix B: Scientific criteria developed for the identification of sensitive areas for migratory birds

Scientific criteria developed for the identification of Important Bird and Biodiversity Areas (IBAs) and Marine IBAs by the NGO BirdLife International, the critical sites network developed under the Wings over Wetlands (WOW) UNEP-GEF African-Eurasian Flyways Project, and the East Asia-Australasian Flyway Partnership (EAAFP) are presented in the three tables below.

Table B1: IBA Criteria used to identify Marine IBAs

#	Criterion		Description
1	A1	Globally threatened Species	Site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.
2	A2	Restricted Range Species	Site is known or thought to hold a significant component of the group of species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).
3	A3	Bio-restricted Assemblages	Site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome
4	A4	Congregations	Site known or thought to hold, on a regular basis, ≥ 1% of a biogeographic population of a congregatory waterbird species Site known or thought to hold, on a regular basis, ≥ 1% of the global population of a congregatory seabird or terrestrial species Site known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabirds of one or more species Site known or thought to exceed thresholds set for migratory species at bottleneck sites

Table B2: Criteria for the identification of Critical Sites in the Critical Site Network Tool (WOW)

CSN criterion 1	Site is known or thought to regularly/ predictably hold significant numbers of a population of a globally threatened waterbird species
CSN criterion 2	Site is known or thought to regularly/ predictably hold >1% of a flyway or other distinct population of a waterbird species

Table B3: Criteria for inclusion of site in the Flyway Site Network of EAAFP Partnership

	Criterion Category	Criterion
1	Ramsar Convention criteria for internationally important sites	Wetland supports vulnerable, endangered or critically endangered species or threatened ecological communities Regularly supports 20,000 or more waterbirds Regularly supports 1% of the individuals in a population of one species or subspecies of waterbirds
2	Staging criteria	Site regularly supports 0.25% of individuals in a population of one species or subspecies of waterbirds in migration Regularly supports 5,000 or more waterbirds at one time during migration
3	Exceptional circumstances	Site supports migratory waterbirds at a level or stage of their life cycle important to the maintenance of flyway populations. Nominations to be considered by the Partnership on a case-by-case basis.

Sources:

Marine IBA e-atlas. Available https://maps.birdlife.org/marineIBAs/default.html; accessed 22

Jan 2018. It is based on standardised techniques for identifying priority sites for the conservation of seabirds at sea. Available http://datazone.birdlife.org/userfiles/file/Marine/Marinetoolkitnew.pdf; accessed 22 Jan 2018. This refers to Ramsar Criteria A4 which aims to identify congregations of birds, as well as, to other initiatives. CMS Scientific Council Flyways Working Group Review 2, 11 April 2011 [130].

Criteria used for both the African-Eurasian Flyways Project and work under the Ramsar Convention. Critical site identification method of WOW. See Wings over wetlands UNEP/GEF African-Eurasian Flyways Project (2011) The Critical Site Network: Conservation of internationally important sites for waterbirds in the African-Eurasian Waterbirds Agreement area. Wetlands International. Ede, The Netherlands and BirdLife International, Cambridge, UK. Available http://www.eaaflyway.net/documents/resources/Critical_Site_Network.pdf ; accessed 19 Jan 2018

Site network of the East Asian-Australasian Flyway Partnership. Available http://www.eaaflyway.net/about/the-flyway/flyway-site-network/; accessed 19 Jan 2018. Criteria are available at http://www.eaaflyway.net/about/the-flyway/flyway-site-network/become-a-site/#criteria ; accessed 22 Jan 2018

Appendix C: Fisheries Refugia in the SCS

Table C1: Fisheries Refugia in the SCS

Fisheries Refugia Sites	Location	8th Meeting (2006)[a]	10th Meeting (2008)[b]
Koh Kong	Cambodia	Y (T)	Possibly included
Kampot	Cambodia	Y	Y
Koh Chang Strait and Trat Bay	Thailand	Y	Y
Chumphon Group	Thailand	Y	Y
Samui Island	Thailand	Y	Y
Pha Ngan Fisheries Refugia	Thailand	Y	Y
Pattani Bay Fisheries	Thailand	Y (T)	Y
Khung Krabaen Bay Seagrass Areas	Thailand	N	Y
Phu Quoc Island	Vietnam	Y	Y
Hon Chuoi to Phu Quoc Island	Vietnam	Y	Y
Binh Thuan Province to Con Dao Island	Vietnam	Y	Y
Hon La - Hon Nom Islands in Quang Binh Province	Vietnam	Y	Y
Bach Long Vi Island	Vietnam	Y	Y
Haiphong - Nam Dinh including Xuan Thuy National Park	Vietnam	Y (T)	Y
Co To to Ha Mai Island	Vietnam	N	Y
Ninh Co to Lach Ghep Estuary	Vietnam	N	Y
Cu Lao Thu (Phu Qui)	Vietnam	N	Y
Cu Lao Cham	Vietnam	N	Y
Cua Dai Mekong River mouth	Vietnam	N	Y
Lingayen Gulf	Philippines	Y	Y
Masinloc	Philippines	Y	Y
Batangas Coast	Philippines	Y	Y
Ilocos Coast	Philippines	N	Y
Busuang - Calamianes	Philippines	Y	Y
Malampaya Sound	Philippines	Y	Y
West Kalimantan	Indonesia	Y (T)	Y
Bangka Belitung	Indonesia	Y	Y
Riau Islands Group and Riau Province Coast	Indonesia	Y	Y
East Bintan	Indonesia	N	Y
Pulau Perhentian	Malaysia	N	Y
Pulau Island	Malaysia	N	Y
Pulau Tioman	Malaysia	N	Y
Off Bintulu	Malaysia	N	Y
Off Miri	Malaysia	N	Y
Labuan	Malaysia	N	Y
Off Kota Kinabalu	Malaysia	N	Y
Tun Mustapha Park	Malaysia	N	Y
Turtle Islands	Malaysia	N	Y
Sulu Sulawesi (Talantam Shoal/Pearl Bank)	Malaysia	N	Y
Off Semporna to Pulau Sibutu	Malaysia	N	Y

Legend:

Y : Yes – Mentioned in the respective meeting report

N : No – Not mentioned in the respective meeting report

Y(T) : Mentioned in the respective meeting reports but still tentative. These sites are under consideration but not confirmed

[a] Based on Information contained in Report of 8th Meeting of the Regional Working Group for the Fisheries Component, Bangka Belitung Province, Indonesia, 1st-4th November 2006, Annex 6. UNEP/GEF/SCS/RWF-F 8/3

[b] Based on Inventory of Known Spawning and Nursery Areas for Economically Important Fish Species in the SCS and Gulf of Thailand, 10th Meeting of the Regional Working Group for the Fisheries Component of the UNEP/GEF Project: Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, Busanga - Philippines, 2-5 June 2008. UNEP/GEF/RWG-F.10/7

Appendix D: Ecological criteria included in Tables 3.1 and 3.2 of Part 1

This Appendix provides details of the analysis behind the basis for the summaries presented in Tables 3.1 and 3.2 in Part 1. The numbering of each set of criteria has been 'normalised' where necessary to simple rational numbers (no letters) to simplify the comparison. The new 'normalised' criterion number is indicated in the respective table of criteria presented in Chapters 1 and 2 for each set. For each criterion, the guidance document adopted by the relevant authority, as well as available expert reports and peer-reviewed articles have been consulted. The analysis is also based on the discussion and references relating to each family of instruments, development and use of scientific criteria in Chapters 1 and 2.

Uniqueness or rarity

With respect to data quality, the Ottawa Report clarifies that where biological data are scarce, physical data may provide the only basis for application of this criterion.

Table D1: Criteria included in instruments that are equivalent to uniqueness or rarity as a criterion to identify sensitive marine areas

Source	Criterion	Uniqueness or rarity or distinctiveness
EBSAs	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
Ramsar Sites	1	Contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
OUVs	7	Superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance
IOSEA Marine Turtles	1.4	Site containing the presence of a marine turtle species that is considered rare in the IOSEA region
EAAFP Flyway	1	Criterion 1 from Ramsar
ASEAN Heritage Parks	8	Additional criterion uniqueness: Site may possess special features that could not be seen in any other site
ASEAN MPAs	3.5	Uniqueness: Whether an area is 'one of a kind'
MARPOL Special Areas	2.4	Rare [or fragile] ecosystems
PSSAs	1.1/1.11	Uniqueness or rarity: 'the only one of its kind', Can be habitats of rare, threatened or endangered species that only occur in one area (1.1) Contains rare geographic qualities or representative of a biogeographic 'types(s)' or or contains unique or unusual biological, chemical, physical or geological features (1.11)
VMEs	1	Uniqueness or rarity - includes habitats/nurseries/feeding/ breeding/spawning areas of endemic/threatened/ endangered species
APEIs	-	No clear reference
LC/LP	3	No express reference. Possible overlap with area of biological importance
OPRC	2.1/2.2	No express reference but included if sensitive to oil

IMMAs	4.1	Areas which sustain populations with important genetic, behavioural or ecologically distinctive characteristics
KBAs	2.1/2.2/2.3/ 2.4/5	Criteria on geographically restricted biodiversity and irreplaceable sites

Special importance for life history of species

This criterion 2 of the EBSA criteria can be applied to any population, including threatened and endangered species and migratory species.

Table D2: Criteria included in instruments that are equivalent to the criterion 'special importance for life history of species' to identify sensitive marine areas

Source	Criterion	Special importance for life history of species
EBSAs	2	Areas that are required (undefined-qualitative) for a population to survive and thrive/ support critical life-history stages of individual species. The significance of an area increases as either factor (reliability over time, exclusivity relative to alternative areas) increases
Ramsar Sites	4/7/8	Supports populations of plant and/or animal species at a critical stage in their life cycle. Also overlap with specific criteria for fish. Criteria 7 and 8 specifically mention life-history stages.
OUVs	10	Most important and significant natural habitats for *in-situ* conservation of biological diversity (includes a specific reference to migratory species and their critical habitats)
IOSEA Marine Turtles	1.1/1.2	Ecological and biological criteria: abundance at nesting sites and abundance at foraging sites Also, CMS COP10, 11 and 12: all sites that perform a critical role for migratory species such as core areas and corridors must be identified and conserved.
EAAFP Flyway	1/2	Criterion 1 from Flyway Network imports Ramsar criteria (criterion 4 here) and criterion 2 on staging criteria as well as criterion 3 on exceptional circumstances for sites supports migratory waterbirds at stage of life cycle and important to the maintenance of the flyway population.
ASEAN Heritage Parks	4/10	Areas of high conservation importance including areas that have global significance for the conservation of important or valuable species (including areas that have special importance for life history of species as evidenced by existing marine parks which include such features)[a]. Also additional criterion 10 which includes habitat of importance for endangered or precious biodiversity flora and fauna
ASEAN MPA	3.3	No reference to life history but similar to dependency criterion as being the degree to which species depends on an area
MARPOL Special Areas	2.3/2.4	Spawning, breeding and nursery areas for important marine species including migratory species; and critical habitats for marine resources (including coral reefs, mangrove, seagrass beds, etc.)
PSSAs	1.2/1.7	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 Spawning or breeding grounds: critical spawning/breeding/nursery areas for birds or marine species that may spend the rest of their life cycle elsewhere or for migratory routes
VMEs	2	Functional significance of the habitat: discrete areas of habitats necessary for the survival, function, spawning, recovery, articular life-history stages or of rare threatened or endangered species
APEIs	-	No clear reference
LC/LP	5/6/7	Criterion 5 on spawning/nursery/recruitment, criterion 6 on migration and criterion 7 on seasonal and critical habitats
OPRC	2.1/2.2	2.1: Sensitive areas and species – 2.2: Sub-tidal habitats
IMMAs	3.1/3.2/3.3	Key life cycle activities: reproductive areas, feeding areas and migration routes
KBAs	4.3	Demographic aggregations and Recruitment sources

Explicative notes:

[a] Lampi National Park in Myanmar has nesting grounds for three species of marine turtles and includes several sensitive habitats such as coral reefs and mangroves. Tarutao National Park also hosts nesting sites for three species of marine turtles. See ASEAN Centre for Biodiversity (2010) The ASEAN Heritage Parks. A Journey to the Natural Wonders of Southeast Asia. Los Banos, Laguna, Philippines [155, 241].

Importance for threatened, endangered or declining species and/or habitats

Table D3: Criteria included in instruments that are equivalent to the criterion of importance for threatened, endangered or declining species and/or habitats to identify sensitive marine areas

Source	Criterion[a]	Importance for threatened, endangered or declining species and/or habitats
EBSAs	3	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. The greater the persistence of use of the area and the greater the number of individuals, the more important the area. Use of the IUCN Red List should determine species to which the criterion applies. In case of data deficiency, use organism with similar life-history traits.
Ramsar Sites	2	Site supports vulnerable, endangered or critically endangered species or threatened ecological communities; it includes vulnerable and threatened habitats such as mangroves and coral reefs. Non-quantitative criterion especially useful where a site is known to be important for the species concerned but populations assessments are not available.[b]
OUVs	10	Most important and significant natural habitats for *in-situ* conservation of biological diversity (including those containing threatened species of OUV)
IOSEA Marine Turtles	Implied	Implied, as these criteria concern only endangered species of marine turtles (listed on CMS Appendices I and II as well as CITES Appendix I and IUCN Red List)
EEAFP Flyway	1	Criterion 1 from Flyway Network imports Ramsar criteria: wetland supports vulnerable, endangered or critically endangered species or threatened ecological communities. Also Ramsar criterion 2
ASEAN Heritage Parks	4/10	Areas of high conservation importance including areas that have global significance for the conservation of important or valuable species (as evidenced by existing marine parks which include such features).[c] Also additional criterion 10 on importance for endangered or precious biodiversity
ASEAN MPA	3.1/3.3/3.8	Endangered species is mentioned under criterion 3.1 uniqueness. Can also be included in 3.3 (dependency) and 3.8 vulnerability
MARPOL Special Areas	2.1	Depleted, threatened or endangered marine species
PSSAs	1.1/1.2	Uniqueness or rarity to the extent that it applies to an area or ecosystem that is seriously depleted across its range; or the habitat of threatened or endangered species that only occurs in one area 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
VMEs	1/2	Uniqueness or rarity criterion based on the example of habitats of threatened or endangered species; Functional significance of the habitat is described as including habitats necessary for threatened or endangered species
APEIs	-	No clear reference
LC/LP	3,5,6,7	No explicit reference but included in criteria 3, 5, 6 and 7
OPRC	2.1/2.2	2.1 : Sensitive areas and species including endangered species/ecosystems 2.2 : Sub-tidal habitats
IMMAs	1	Species or population vulnerability: areas containing habitat important for the survival and recovery of threatened and declining species.
KBAs	1.1/1.2	Threatened biodiversity (species and ecosystem types)

Explicative notes:

[a] The criterion which most clearly seeks to identify areas that have a 'special importance for life histories of species' are indicated first

[b] Ramsar Guidelines [paras. 125 and 128]

[c] Tubbataha Reefs National Park in the Philippines host breeding and feeding grounds for endangered species such as the Christmas Island Frigatebird (*Fregata andrewsi*) and the Hawksbill Turtle (*Eretmochelys imbricata*) as well as Humphead Wrasse (*Cheilinus undulates*). Information available on Ramsar Sites Information Service.

Vulnerability, fragility, sensitivity, slow recovery of species and habitats

Table D4: Criteria included in instruments that are equivalent to the criterion of vulnerability, fragility, sensitivity, slow recovery of species and habitats to identify sensitive marine areas

Source	Criterion	Vulnerability, fragility, sensitivity, slow recovery of species and habitats
EBSAs	4	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally (intrinsic) fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. Vulnerability can normally only be evaluated relative to threats but lack of information may not be an obstacle to identification if features of ecosystem are fragile/sensitive/slow to recover and vulnerable to a wide range of threats
Ramsar Sites	2	Site supports vulnerable, endangered or critically endangered species or threatened ecological communities. Ramsar criterion 2 includes both EBSA criteria 3 and 4. May include fragile and sensitive habitats. However, vulnerable species are defined as those facing a high risk of extinction in the wild in the medium-term future (according to the definition of the Species Survival Commission of the IUCN)[a]
OUVs	10	No express reference in selection criteria for identification of OUV but can be included in criterion 10 and also be a part of the demonstration of existing adverse effects needed to obtain World Heritage site status (in the assessment of integrity)
IOSEA Marine Turtles	Implied	Implied, given characteristics of species concerned
EEAFP Flyway	1	Criterion 1 from Flyway Network imports Ramsar criteria: wetland supports vulnerable, endangered or critically endangered species or threatened ecological communities. Also Ramsar criterion 2
ASEAN Heritage Parks	4	Could be included in criterion 4 'Areas of high conservation importance including areas that have global significance for the conservation of important or valuable species' as designated sites present these characteristics. However, site descriptions are not available or generally not very detailed on this point.[b]
ASEAN MPA	3.8	Vulnerability: Degree to which an areas is susceptible to degradation by natural events or anthropogenic activities
MARPOL Special Areas	2.1/2.4	Depleted, threatened or endangered marine species, and Rare or fragile ecosystems
PSSAs	1.10/1.3	Fragility: highly susceptible to degradations. Existing stress can justify need for special protection from further stress. Can also overlap with criterion 1.3 dependency with respect to areas where ecological processes are highly dependent on biotically structured systems and which are sensitive
VMEs	3/4	Fragility: highly susceptible to degradation by anthropogenic activities Life-history traits of component species that make recovery difficult: population or assemblages of species with either slow growth rate. Late maturity, long or unpredictable recruitment or long-lived
APEIs	-	No express reference
LC/LP	3,5,7	No express equivalent criterion. Possible overlap with criteria 3, 5 and 7
OPRC	1/2.1/2.2/3	Applies to all criteria
IMMAs	1	Criterion 1 on species or population vulnerability: areas containing habitat important for the survival and recovery of threatened and declining species
KBAs	-	Not a criterion for the identification of site of importance for the global persistence of biodiversity but a critical element in the determination of the management measure.

References:

[a] Ramsar Guidelines [paras. 125, 128 and 138]

[b] Ramsar Guidelines [paras. 125, 128 and 138]

Biological productivity

Table D5: Criteria included in instruments that are equivalent to the criterion of biological productivity to identify sensitive marine areas

Source	Criterion	Biological productivity
EBSAs	5	Area containing species, populations or communities with comparatively higher natural biological productivity (primary or secondary). Abundance is different but often a fine surrogate. Criterion intended for the open oceans.
Ramsar Sites	5/6/7/8/9	Possibly indirect reference through quantitative minima for subspecies, species or families of waterbirds or fish or other wetland-dependent species being supported by a wetland (Ramsar criteria 5, 6, 7 and 9) or criterion 8 relating to fish and a wetland being an important source of food for fishes, spawning ground, nursery and/or migration path that fish stocks, either within the wetland or elsewhere, depend on.[a]
OUVs	-	Not included
IOSEA Marine Turtles	-	Not direct reference
EEAFP Flyway	1	Same as for Ramsar. Productivity is not mentioned explicitly. Focus on ability of areas to support a certain number of individuals or proportion of population.
ASEAN Heritage Parks	4	No direct reference. Possible implicit reference in criterion 4 'high conservation importance' which refers to 'valuable' species and ecosystems, given the importance of development vs conservation for developing States
ASEAN MPA	3.7	Productivity: Degree to which productive processes within the area contribute benefits to species or to humans
MARPOL Special Areas	2.2	Areas of high natural productivity (such as fronts, upwelling areas, gyres)
PSSAs	1.6	Productivity: 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
VMEs	2	No direct reference. May overlap with criterion 2 on functional significance of habitat as areas of high natural productivity can have such functional significance, e.g. seamounts with relatively high productivity compared to surrounding waters
APEIs	-	No clear reference
LC/LP	4	Partly equivalent criterion 4 on fishing areas (e.g. ocean fronts)
OPRC	1/3	1.Biological productivity (shorelines), 3. Fishing areas
IMMAs	2.2/3.2	No direct reference but mentioned in the guidance as comparable to IMMA criteria 2.2 (Aggregations). Also, possible overlap with criterion 3.2 (feeding areas)
KBAs	4.1	Overlap with demographic aggregations

Explicative notes:

[a] According to the Ramsar Guidelines, productivity is an essential benefit of wetlands [para. 28]

Biological diversity

Table D6: Criteria included in instruments that are equivalent to the criterion of biological diversity to identify sensitive marine areas

Source	Criterion	Biological diversity
EBSAs	6	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. Different factors can be considered: number and relative abundance of different elements (e.g. 'richness' vs 'evenness'), and measure of variance in these elements (e.g. taxonomic distinctiveness). When species survey data are lacking, habitat characteristics can provide indications of diversity (e.g. habitats of higher complexity)
Ramsar Sites	3/7	Supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region Also supports a significant proportion of indigenous fish species, subspecies or families, species interactions and/or populations that are representative of wetland benefits Endemism must be measured Conservation of biological diversity is a key objective of Ramsar, according to the Guidelines
OUVs	9/10	Outstanding examples representing significant on-going ecological and biological processes in the evolution and development of (…) coastal and marine ecosystems and communities of plants and animal (e.g. coral reefs, as well as, mangrove and seagrass being adjacent ecosystems which contribute to regulating nutrient and sediment inputs into the reef) Most important and significant natural habitats for in-situ conservation of biological diversity
IOSEA Marine Turtles	1.3/3.6	No mention of 'biological diversity' but criterion 1.3 focuses on species or management unit richness, i.e. the number of species or marine turtle management units (if known) regularly using a site's nesting habitat or foraging habitat – a measure of a component of biodiversity Also criterion 3.6 on biodiversity conservation initiative being an ancillary benefit of site selection
EEAFP Flyway	1	Application to diversity in species and sub-species of waterbirds. Also imported from the application of Ramsar.
ASEAN Heritage Parks	4	Overlap with criterion 4 on areas of high conservation importance (expressly referred to in the 2003 ASEAN Declaration on Heritage Parks and Reserves)
ASEAN MPA	3.1	Diversity: Variety or richness of ecosystems, habitats, communities and species
MARPOL Special Areas	2.4	No explicit reference. Criterion 2.4 on rare or fragile ecosystems and critical habitats for marine resources can overlap. Other criteria for specific components of biodiversity (2.1: depleted, threatened, endangered, 2.3: spawning, breeding and nursery areas for important species) can also overlap.
PSSAs	1.5	Diversity: May have exceptional variety of species or genetic diversity or highly varied ecosystems/habitats/communities
VMEs	5	Overlap with criterion 5 for 'structural complexity' as systems with high diversity which is dependent on the structuring organisms are often described as meeting this criterion.
APEIs	Guiding principle	No explicit reference in the selection and design criteria but included in the Guiding Principles in the establishment of the management plan[a]
LC/LP	3	Criterion 3 on scientific and biological importance
OPRC	2.1/2.2	Overlap with criteria 2.1-Sensitive areas and species and 2.2-Sub-tidal habitats
IMMAs	4.2	Special Attributes- diversity: Areas containing habitat that supports an important diversity of marine mammal species
KBAs	1.1/1.2/2.1 to 2.4/3	Overlap with several criteria as identification of biodiversity elements is the purpose of these criteria. Could even be considered to overlap with all

Explicative notes:

[a] ISBA/17/LTC/7 [para. 13]

Naturalness

Table D7: Criteria included in instruments that are equivalent to the criterion of naturalness to identify sensitive marine areas

Source	Criterion	Naturalness and/or integrity
EBSAs	7	Area with a comparatively higher degree of naturalness as a result of the lack, or low level of, human induced disturbance or degradation. Not required to be pristine. Where the 'natural' state is unknown, consider the history of human activity in this area and its impact. Cumulative effects may need to be assessed.
Ramsar Sites	1/3/4/..	Not an expressed Ramsar criterion. However, integrity of the system is implied in most criteria. Criterion 1 refers to near-natural wetlands, meaning that they 'continue to function in what is considered an almost natural way'.[2] Must retain their ecological values.
OUVs	1/10	Called integrity in this instrument. A requirement of all criteria rather than an independent criterion. It is a measure of the wholeness and intactness of the natural and/or cultural heritage and its attributes.[2]
IOSEA Marine Turtles	Implied	No direct reference but implied condition of habitat integrity for it to qualify as 'critical habitat'. Mentioned under criteria 3.2 and 3.3 as activities and educational values which must not affect habitat activity to remain compatible[3]
EEAFP Flyway	1	Same as Ramsar and IOSEA Marine Turtles
ASEAN Heritage Parks	1/3	Ecological completeness: An intact ecological process and capability to regenerate with minimal human intervention Naturalness: In natural condition such as a second-growth forest or a rescued coral reef formation, with natural processes still going on
ASEAN MPA	3.2	Naturalness: Lack of disturbance or degradation
MARPOL Special Areas	-	Not included
PSSAs	1.8/1.9	Naturalness: relative lack of human-induced disturbance or degradation Integrity: biologically functional unit, an effective, self-sustaining ecological entity
VMEs	-	Not included
APEIs	2	An element of the scientific design criterion of sufficient size to protect and ensure the ecological viability and integrity of the features for which they were selected[4]
LC/LP	-	Not included
OPRC	-	No explicit equivalent criterion. Possible overlap depending on sensitivity to oil of 'natural' area
IMMAs	Implied	No explicit equivalent criterion though habitat integrity is an implied condition[5]
KBAs	3	Ecological integrity: a condition that supports intact species assemblages and ecological processes in their natural state, relative to an appropriate historical benchmark, and characterised by contiguous natural habitat with minimal direct industrial anthropogenic disturbance[6]

Explicative notes

[1] Ramsar Handbook [para. 117]. The definition adds that this clarification is provided to allow for the listing of sites which are not pristine, yet retain ecological values that nonetheless make them internationally important. The link with 'naturalness' is also expressedly made in the Ramsar Guidelines. Ramsar Guidelines [para. 57]

[2] World Heritage Convention Guidelines [para. 88]

[3] IOSEA Marine Turtle Criteria for the Evaluation of Nominations to the Network of Sites of Importance for Marine Turtles in the Indian Ocean-Southeast Asia region [7-8].

[4] ISBA/14/LTC/7 [para. 27]
[5] Especially for the application of criterion diversity (4.2); the importance of maintaining the integrity of IMMAs and network is also generally highlighted in IMMA Guidance document [20, 53].
[6] IUCN Global Standard for the Identification of KBAs [12].

Representativity

Table D8: Criteria included in instruments that are equivalent to the criterion of representativity to identify sensitive marine areas

Source	Criterion	Representativity[1]
EBSAs	-	Not an EBSA criteria. However, it is the second of five network properties and components for selecting areas to establish representative network of MPAs. Representativity consists of areas representing the different biogeographical subdivisions of the global oceans and regional seas that reasonably reflect the full range of ecosystems, including the biotic and habitat diversity of those marine ecosystems
Ramsar Sites	1	Representative wetland type found within the appropriate biogeographic region defined as a scientifically rigorous determination of regions as established using biological and physical parameters;[2] The major assessment of the Marine Ecoregions of the World (Spalding et al., 2017) is provided as reference[3]
OUVs	10	Not an explicit criterion although the World Heritage Committee seeks to establish a 'Representative, Balanced and Credible World Heritage List'.[4] In this context 'representative' appears to refer to the representation of the different types of existing natural and cultural heritages. The Operational Guidelines indicate that criterion 10 on most important and significant natural habitats for *in situ* conservation include those that are representative, i.e. characteristics of a biogeographic province.
IOSEA Marine Turtles	4.1	A network-wide ecological criterion - Representativeness and replication: Site contributes to the network's: (i) adequate representation of the full range of habitat diversity required for the maintenance of marine turtle management units and species of the IOSEA region (representativeness), and/or (ii) inclusion of multiple sites containing identical habitat types (replication)
EEAFP Flyway	1	Imported from Ramsar criteria
ASEAN Heritage Parks	2	Variety of ecosystems or species typical of a particular region
ASEAN MPA	3.4	Representativeness: Degree to which an area represents a habitat type, ecological process, biological community, physiographical feature or other natural characteristic
MARPOL Special Areas	-	Not included
PSSAs	1.4/1.11	Representativeness: 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 Bio-geographic importance: includes areas that are representative of a biogeographic "type" or types
VMEs	-	Not included
APEIs	1	Representativity of the full range of habitats based on biogeographic areas identified for the CCZ
LC/LP	-	Not included
OPRC	-	Not included. Would be covered, however, if protected under local legislation.
IMMAs	-	Not included
KBAs	-	Not included

Legend:
[1] Application of this criterion presupposes the understanding of the spatial distribution of ecosystems, habitats and species at a biogeographical scale. Identification of units which should be represented in a network presupposes the use of biographic classification systems. Different classification systems can be used. (Ottawa Report [34])
[2] Ramsar Guidelines [119]
[3] Ramsar Guidelines [17]; Spalding et al. (2007) Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas.
[4] World Heritage Convention Operational Guidelines [para. 54]

Connectivity

Table D9: Criteria included in instruments that are equivalent to the criterion of connectivity to identify sensitive marine areas

Source	Criterion	Connectivity
EBSAs	-	Not an EBSA criteria. However, it is the third of five network properties and components for selecting areas to establish representative network of MPAs. Connectivity in the design of a network allows for linkages whereby protected sites benefit from larval and/or species exchanges, and functional linkages from other network sites. In a connected network, individual sites benefit one another
Ramsar Sites	-	Not a criterion. However, the Guidance for Ramsar Site Description highlights the importance of connectivity in wetland selection, especially with respect to clusters of small sites or individual small 'satellite' sites associated with larger areas[1]
OUVs	-	Not a criterion. However, guidelines highlight that habitat connectivity may be taken into account where a Heritage site is composed of component sites[2]
IOSEA Marine Turtles	4.2	Ecological connectivity: site contributes to protecting functional links among areas of marine turtle habitat
EEAFP Flyway	-	Not included
ASEAN Heritage Parks	-	Not included
ASEAN MPA	-	Not included
MARPOL Special Areas	-	Not included
PSSAs	-	Not included
VMEs	-	Not included
APEIs	-	Not included
LC/LP	-	Not included. Would be covered if protected under local legislation.
OPRC	-	Not included
IMMAs	3.1-3.3	An implicit component of criterion 3 on key life cycle activities: genetic connectivity/connectivity between different areas (breeding and feeding areas) is critical to informing identification of IMMA[3]
KBAs	-	Not an explicit criterion but an important consideration in site delineation[4]

Legend:
[1] Ramsar Guidelines [23]
[2] World Heritage Convention Operational Guidelines [para. 137]
[3] IMMA Guidance [59]

[4] IUCN Global Standard for the Identification of KBAs [13,27]

Refugia or site resistance or resilience

Table D10: Criteria included in instruments that are equivalent to the criterion of refugia to identify sensitive marine areas

Source	Criterion	Refugia or site resistance or resilience
EBSAs	-	Not included (although resilience is one of the rationales for the identification of EBSAs).[1] Refugia for threatened, endangered or declining species and/or habitats could be included in criterion 3
Ramsar Sites	4	Provide refuge during adverse conditions (a sub-criterion to identify sites of international importance for conserving biological diversity)
OUVs	10	Not express reference (although could be included in criterion 10 about the most important sites for the conservation of biological diversity, as an attribute of critical habitats essential to ensure the survival of viable populations of these species
IOSEA Marine Turtles	1.5	Resistance and resilience: Site containing habitat of importance to marine turtles that is likely to be relatively resistant and/or resilient to disturbance
EEAFP Flyway	1	Criterion from Ramsar
ASEAN Heritage Parks	-	Possible overlap with criterion 1 ecological completeness: wholesome or intact ecological processes and capability to regenerate with minimal intervention
ASEAN MPA	-	Not included as an explicit ecological criterion although there could be some overlap with criterion 3.6 integrity (Degree to which the area is a functional unit – an effective, self-sustaining ecological entity) in situations where refugia present such characteristics. In situations where refugia concern commercially valuable species, there could also be an overlap with criteria 2.1 (importance to economic species) or 2.3 (degree to which protection will benefit the local economy in the long term)
MARPOL Special Areas	2.4	No express reference. May be included in criterion 2.4 where such areas are critical habitats for marine resources/ critical importance for the support of marine ecosystems such as large marine ecosystems
PSSAs	1.2	No express reference. May be included in criterion 1.2 on critical habitats, essential for the survival, function, or recovery of fish stocks or rare or endangered species or for the support of large marine ecosystems
VMEs	-	No express reference. Possible but unconfirmed partial overlap with criterion 5 on structural complexity on the basis that system complexity can be an attribute of more resilient systems.[2]
APEIs	-	Not included
LC/LP	-	No express equivalent. Possible but unconfirmed equivalence with criterion 3 on scientific importance or biological importance
OPRC	-	Not included. However, would be covered if protected under local legislation.
IMMAs	-	Not included
KBAs	4.2	Ecological refugia: site holds a significant proportion of the global population size of a species during periods of environmental stress

Legend:

[1] Rationale for EBSA criterion 6 biological diversity

[2] Ardon et al. (2014)

Appendix E: IUCN Key Biodiversity Areas (KBAs)

Following the 2004 World Conservation Congress, the IUCN embarked on a journey towards the development of a 'methodology to enable countries to identify Key Biodiversity Areas' (KBAs), based on Resolution 3.013. The criteria established by the IUCN to identify such KBAs are set out in the 2016 Global Standard for the Identification of Key Biodiversity Areas (the IUCN KBA Standard) which also includes quantitative thresholds. Assessment of the risk of extinction of species or ecosystems is based on the IUCN Red List of Threatened Species and the IUCN Red List of Ecosystem and Categories of Criteria. These criteria aim to identify sites that contribute to the global persistence of biodiversity at genetic, species and ecosystem levels. It is important to note that unlike the other suites of criteria discussed so far, these criteria were designed to apply to biodiversity in terrestrial and inland water, as well as the marine environment. (IUCN KBA Standard [1]

Table E1: IUCN KBA Criteria[1]

#	Criterion Category		Criterion	Description[2]
1.1	A1	Threatened biodiversity	Threatened species	Site holds a significant proportion of the global population size of a species facing a high risk of extinction
1.2	A2		Threatened ecosystem types	Site hold a significant proportion of the global extent of an ecosystem type facing a high risk of collapse
2.1	B1	Geographically restricted biodiversity	Individual geographically restricted species	Site holds a significant proportion of the global population size of a geographically restricted species
2.2	B2		Co-occurring geographically restricted species	Site hold a significant proportion of the global population size of multiple restricted-range species
2.3	B3		Geographically restricted assemblages	Site holds assemblages of species within a taxonomic group that are globally restricted
2.4	B4		Geographically restricted ecosystem types	Site holds a significant proportion of the global extent of a geographically restricted ecosystem type
3	C	Ecological integrity	Ecological integrity	Site holds wholly intact ecological communities with supporting large-scale ecological processes
4.1	D1	Biological processes	Demographic aggregations	Site holds a significant proportion of the global population size of a species during one or more life history stages or processes
4.2	D2		Ecological refugia	Site holds a significant proportion of the global population size of a species during periods of environmental stress
4.3	D3		Recruitment sources	Site where a significant proportion of the global population size of a species is produced
5	E	Irreplaceability through quantitative analysis		Site has very high irreplaceability for the global persistence of biodiversity as identified through a complementarity-based quantitative analysis of irreplaceability

Legend:

[1] IUCN (2016) Global Standard for the Identification of Key Biodiversity Areas, Version 1.0 First Edition. Gland, Switzerland: IUCN.

[2] Each criterion includes a quantitative threshold also included in the IUCN KBA Standard. For example, criterion A1 'threatened species' requires that a site holds one or more of the following: ≥ 5% of the global extent of a globally critically endangered or endangered ecosystem type or ≥ 10% of the global extent of a globally vulnerable ecosystem type according to the IUCN Red List of Ecosystems Categories and Criteria.

Appendix F: Quantitative comparison of ecological criteria

Table F2 is based on a numerical analysis of the findings captured in Appendix D. The first column shows the 10 criteria included in the Reference Criteria Set (RCS). The 4th column indicates the total count of criteria from the different sets which are equivalent, comparable or overlap expressed with each criterion in the RCS. The 5th column provides the same count for implicit overlap. The 3rd column provides the total, for each criterion of the RCS, of count in the 4th and 5th columns. The 6th column indicates the number of times that no equivalent, comparable or overlapping criterion exist in other sets of criteria. Finally, the 7th column provides the number of times that a criterion from other criteria sets is equivalent, comparable or overlap with a criterion in the RCS.

Table F2: Count of comparable criteria across legally adopted or recognised scientific sets of criteria to identify sensitive marine areas

RCS	Criterion	# total of similar criteria	# of expressly similar criteria (/15)	# likely similar criteria (/15)	# no similar criteria (/15)	# overlap with other criteria in sets of criteria
Uniqueness	A	14	12	2	1	8
Life history	B	14	14	0	1	12
Endangered	C	14	12	2	1	7
Vulnerability	D	13	10	3	2	9
Productivity	E	13	6	7	2	10
Biodiversity	F	15	11	4	0	9
Naturalness	G	12	7	5	3	11
Representativity	H	9	7	2	6	2
Connectivity	I	4	1	3	11	2
Refugia	J	9	4	5	6	0

Table F3 below provides the computation details of the counts summarised in Table F2. 'Imp' stands for 'implied'. The penultimate line provides the list of criteria for each set as described in Appendix D where the corresponding language can be consulted.

Tables F4 to F15 provide the number of occurrences of each criterion, when comparing each criterion set to the RCS. This provides a measure of compatibility of the criteria sets with the RCS. The last row of each table also indicates the number of criteria of the RCS list that are not included in this set of criteria.

Table F3: Quantitative analysis of comparable criteria across legally adopted or recognised scientific sets of criteria to identify sensitive marine areas

RCS	EBSA	Ramsar	OUV	IOSEA Marine Turtles	EAAFP Flyway	ASEAN Heritage Parks	ASEAN MPAs	MARPOL	PSSA	VME	APEIs	LC/LP	OPRC/ Sensitivity	IMMAs	KBAs
A	1	1,2	7	1.4	1	8	3.5	2.4	1.1,1.11	1	Nil	3	2.1,2.2	2.1, 4.1	2.1,2.2, 2.3,2.4, 5
B	2	4,7,8	10	1.1,1.2	1,2	4,10	3.3	2.3,2.4	1.2,1.7	2	Nil	5,6,7	2.1,2.2	3.1,3.2, 3.3	4.3
C	3	2	10	Imp	1	4,10	3.3,3.5, 3.8	2.1	1.1,1.2	1,2	Nil	7	2.1,2.2	1	1.1,1.2
D	4	2	10	Imp	1	4,10	3.8	2.1,2.4	1.10,1.3	3,4	Nil	3,5,7	1,2.1,2.2,3	1	Nil
E	5	5,6,7,8, 9	Nil	1.1,1.2	1	4,7,10	3.7, 4.1	2.2	1.6	2	Nil	4	1,3	2.2,3.2	4.1
F	6	3,7	9,10	1.3,3.6	1	4	3.1	2.4	1.5	5	Imp	3	2.1,2.2	4.2	1.1,1.2, 2.1,2.2, 2.3,2.4, 3
G	7	1,2,3,4, 5,6,7,8, 9	10	Imp	1	1,3	3.2,3.6	Nil	1.8, 1.9	Imp	2	Nil	Nil	Imp	3
H	Other set	1	10	4.1	1	2	3.4,4.2	Nil	1.4,1.11	Nil	1	Nil	Nil	Nil	Nil
I	Other set	Nil	Nil	4.2, 4.3	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	3.1,3.3	Imp
J	Nil	4	10	1.5	1	1	3.6	2.4	1.2	Nil	Nil	Nil	Nil	Nil	4.2
A,B,C,D, E,F,G,H,	1,2,3,4, 5,6,7	1,2,3,4, 5,6,7,8,	7,8,9 ,10	1.1,1.2, 1.3,1.4,	1,2,3 [/3]	1,2,3,4,5, 6,7,8,10	3.1,3.2, 3.3,3.4,	1,2.1,2.2, 2.3,2.4,3	1.1,1.2 ,1.3,1.	1,2,3,4 ,5 [/5]	1,2,3,4 [/4]	3, 4, 5, 6, 7 [/5]	1,2.1,2.2,3 [/4]	1, 2.1, 2.2,	1.1,1.2, 2.1,2.2,

RCS	EBSA	Ramsar	OUV	IOSEA Marine Turtles	EAAFP Flyway	ASEAN Heritage Parks	ASEAN MPAs	MARPOL	PSSA	VME	APEIs	LC/LP	OPRC/ Sensitivity	IMMAs	KBAs
I,J [/10]	[/7]	9 [/9]	[/4]	1.5,4.1, 4.2.4.3 [/8]		[/9]	3.5,3.6, 3.7,3.8, 4.1,4.2 [/10]	[/6]	4,1.5,1 .6,1.7, 1.8,1.9 ,1.10,1 .11 [/11]					3.1,3.2, 3.3,4.1, 4.2 [/8]	2.3,2.4, 3,4.1,4. 2,4.3,5 [11]
#Gaps	*0*	*0*	*8*	*0*	*3*	*5,6*	*0*	*1,3*	*0*	*0*	*3,4*	*0*	*0*	*0*	*0*

Table F4: Consistency of Ramsar criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
Ramsar	1	3
	2	4
	3	2
	4	3
	5	2
	6	2
	7	4
	8	3
	9	2
# criteria in RCS [/10]		9

Table F5: Consistency of IOSEA criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
IOSEA	1.1	2
	1.2	2
	1.3	1
	1.4	1
	1.5	1
	4.1	1
	4.2	1
	4.3	1
# criteria in RCS [/10]		10

Table F6: Consistency of MARPOL Special Areas criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
MARPOL Special Areas	1	0
	2.1	2
	2.2	1
	2.3	1
	2.4	5
	3	0
# criteria in RCS [/10]		7

Table F7: Consistency of OUV criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
OUV	7	1
	8	0
	9	1
	10	7
# criteria in RCS [/10]		8

Table F8: Consistency of EEAFP criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
EEAFP	1	9
	2	1
	3	0
# criteria in RCS [/10]		9

Table F9: Consistency of IMMA criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
IMMA	1	2
	2.1	1
	2.2	1
	3.1	2
	3.2	2
	3.3	2
	4.1	1
	4.2	1
# criteria in RCS [/10]		8

Table F10: Consistency of PSSA criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
PSSA	1.1	2
	1.2	3
	1.3	1
	1.4	1
	1.5	1
	1.6	1
	1.7	1
	1.8	1
	1.9	1
	1.1	1
	1.11	2
# criteria in RCS [/10]		9

Table F11: Consistency of VME criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
VME	1	2
	2	3
	3	1
	4	1
	5	1
# criteria in RCS [/10]		7

Table F12: Consistency of APEI criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
APEI	1	1
	2	1
	3	0
	4	0
# criteria in RCS [/10]		3

Table F13: Consistency of EBSA criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
EBSA	1	0
	2	1
	3	1
	4	1
	5	0
	6	0
	7	0
# criteria in RCS [/10]		7

Table F14: Consistency of LC/LP criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
LC/LP	3	3
	4	1
	5	2
	6	1
	7	3
# criteria in RCS [/10]		6

Table F15: Consistency of OPRC sensitivity criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
OPRC	1	2
	2.1	5
	2.2	5
	3	2
# criteria in RCS [/10]		6

Table F16: Consistency of KBA criteria with RCS

Criteria Set	Criterion	# Occurrence of same criterion in RCS
KBA	1.1	2
	1.2	2
	2.1	2
	2.2	2
	2.3	2
	2.4	2
	3	1
	4.1	1
	4.2	1
	4.3	1
	5	1
# criteria in RCS [/10]		8

Appendix G: Sensitive Areas identified in Southeast Asia under different international and regional instruments (Part 1)

Appendix G (Part 2) and Appendix H are available here:

https://drive.google.com/drive/folders/1Bv-mLAJ2MAn_AVcU5w_OMXwqHEAHmY4h?usp=sharing

All the sensitive marine and coastal areas identified in Southeast Asia under different international and regional instruments discussed in Chapters 1 and 2 have been compiled in the two tables below. Under each instrument, the areas which are identified as sensitive are marked by Yes (if identified under this instrument or if the criterion has been applied), and No if otherwise. Areas which have been the subject of two or more identifications are highlighted in darker blue. Some areas identified as EBSAs under the CBD are large and include several sensitive areas identified under other instruments; in this situation, the smaller overlapping areas are listed under the larger EBSA and their names are right-justified. Of note, in most cases, the overall EBSA has only been identified under the CBD; however, subsets of this EBSA have often been identified several times under other instruments, which is why these subsets may be darker blue when the EBSA itself is light blue.

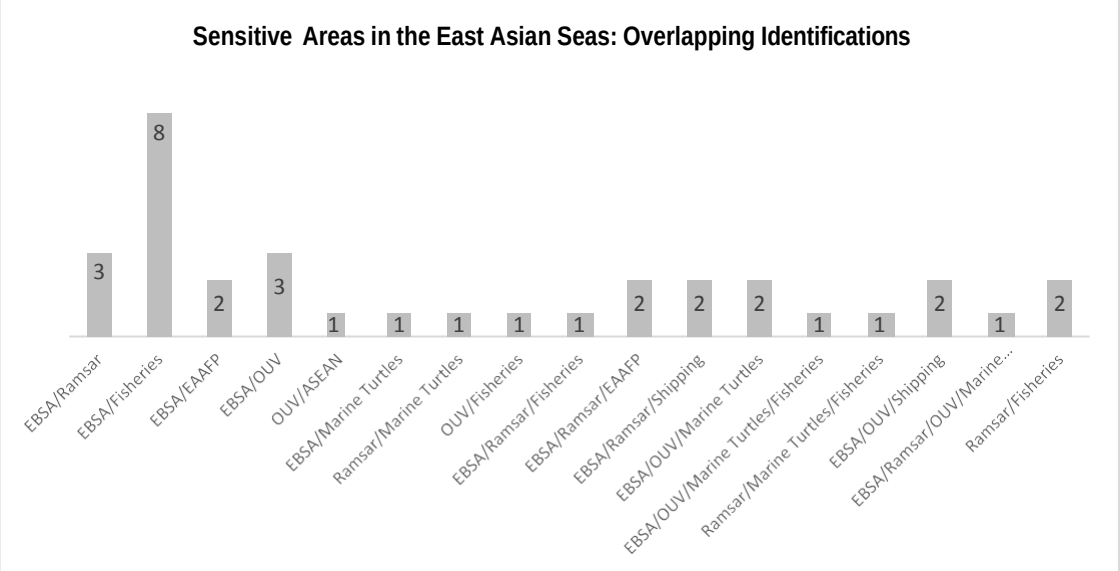

Figure G1: Sensitive Areas in the East Asian Seas: Overlapping Identification