Expanding Protection and Conservation of Coastal and Marine Environment of the ASEAN Region

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The coastal and marine environment of the ASEAN region is among the most important in the world where a third of the world's tropical coastal and marine habitats abound, such as coral reefs, seagrass beds, and mangroves. These marine ecosystems contribute to the health, food security, and livelihood of about 650 m people and help drive the economies of the ASEAN Member States (AMS). However, these marine ecosystems are persistently threatened with overexploitation, use of destructive extractive methods, pollution (i.e. marine plastics, domestic, industrial, and agricultural wastes), and coastal land conversion resulting from poor coastal development planning. At varying rates of decline across the AMS, the marine ecosystems in the region may be vulnerable to the impending impacts of climate change, especially when responses are "business as usual" or inadequate.

A plethora of scientific evidence show that establishment of large effectively managed marine protected areas (MPA) and MPA networks is an effective strategy to arrest rapid degradation and restore marine biodiversity and ecological services.[1] A recent study also reported that on the average, the required coverage for protection to achieve, maximise, or optimise the various MPA objectives is 37 per cent of the sea.[2] These studies further argued that when management outside of protected areas is improved, the performance burden for MPAs is eased such that a little reduction of the eventual target coverage to at least 30 per cent of the sea will still achieve MPA objectives.

Supporting the argument for expanding protection and conservation of coastal and marine environment of the ASEAN region

The extent of larval dispersal is key to the maintenance, persistence, resilience, and recovery of marine biodiversity from a wide array of threats.[3] An improved understanding of the processes of how populations on reefs are replenished and maintained provide the ability to scale up management efforts to optimise the benefits of protection.

This reference document attempts to identify the areas where greater ecological connectivity exists in the ASEAN region using high resolution models based on known reproductive strategies of marine life forms (broadcast spawning for most), the length of their larval duration, and the patterns of water circulation in the region. Further supported by the ecological connectivity matrix, the possible partnerships between parties were also determined. These are where the transboundary MPAs and MPA networks can be established to help marine biodiversity recover and also to increase benefits from its ecological services.

Based on the models generated, these areas refer to **Viet Nam-Philippines-Malaysia sub-region** (NE monsoon, SW monsoon) and the **Indonesia-Malaysia-Philippines sub-region** (NE monsoon, SW monsoon)

Areas of high ecological connectivity. These are areas where the exchange of ecological materials (i.e. genes, nutrients, etc.) are present in significant amounts either within a season or between seasons. An area can become a donor of materials in one season and a recipient in the next.

Scenarios for establishing MPA, MPA networks and opportunities for transboundary cooperation

Scenario 1:

Large MPA networks can be established within each ASEAN Member State because of high particle retention, which suggests that majority of larvae produced are dispersed locally.

Scenario 2:

MPA networks between two or more adjacent AMS can be established because of their relatively strong ecological connectivity (See Figure 1).

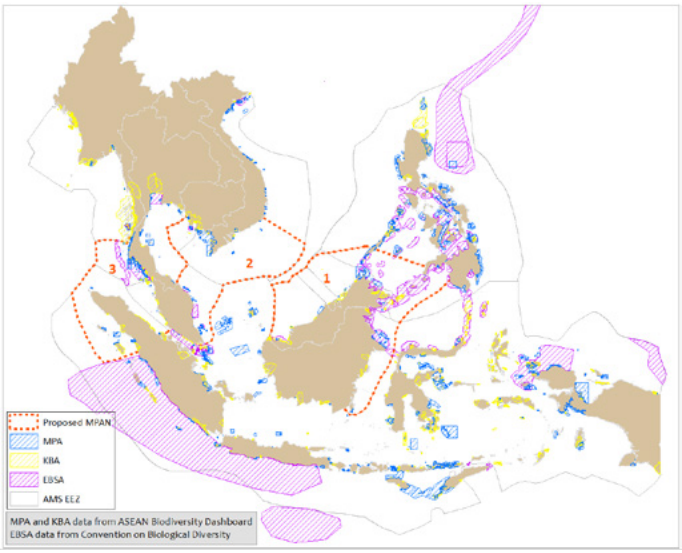

Figure 1. Map of the ASEAN Region showing potential areas for MPA networks under partnerships between respective AMS in 1, 2, and 3 polygons. The relatively strong ecological connectivity within the polygons support the establishment of partnerships to conserve the marine habitats inside the polygons.

Potential MPA Networks	AMS Involved	Estimated Area (km²)	% of ASEAN Coastal and Marine Areas
1	Brunei Darussalam, Malaysia (Sarawak and Sabah), Indonesia (eastern Kalimantan), Southern Philippines (southern tip of Palawan, Sulu archipelago, Moro Gulf)	795,157	10.24
2	Viet Nam, Cambodia and peninsular Malaysia	590,998	7.61
3	Thailand, Malaysia, and Indonesia (Northern Sumatra Island)	531,705	6.85
TOTAL		1,917,860	24.71

Scenario 3:

MPA networks among the AMS and other countries can be established as shown by the relatively strong ecological connectivity in these areas to conserve important marine biodiversity (See Figure 2).

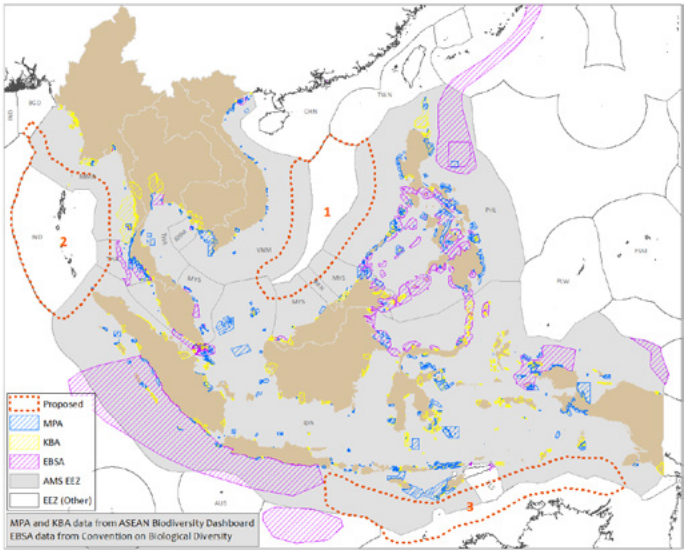

Figure 2. Map of the ASEAN Region showing potential areas for conservation cooperation (e.g., MPA networks) under partnerships between respective AMS and other countries in 1, 2, and 3 polygons. The relatively strong ecological connectivity within the polygons support the establishment of partnerships to conserve the marine habitats inside the polygons.

Proposed MPA Networks	AMS and Other Countries Involved	Estimated Area (km²)	% of ASEAN Coastal and Marine Areas
1	Philippines, Viet Nam, Malaysia, Indonesia, and Brunei Darussalam with China	801,798	10.33
2	Indonesia (Northern Sumatra), Thailand, and Myanmar with Bangladesh and India	1,142,493	14.72
3	Indonesia (Surabaya, West Timor) and Timor Leste with Australia (Northern Territory)	799,687	10.30
TOTAL		2,743,978	35.35

These scenarios comprise at least a potential of 24.71 per cent of the total ASEAN coastal and marine areas protected when transboundary partnerships are established within the region; and 35.35 per cent, when transboundary cooperation is extended to the adjacent territories beyond the ASEAN region.

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Endnotes:
1. Sala E., Mayorga, J., Bradley, D., Cabral, R.B., Atwood, T.B., Auber, A., Cheung, W., Costello, C., Ferretti, F., Friedlander, A.M. et al. (2021). Protecting the global ocean for biodiversity, food and climate. Nature, 592, 397–402.
2. O'Leary B.C., Winther-Janson, M., Bainbridge, J.M., Aitken, J., Hawkins, J.P., and Roberts, C.M. (2016). Effective coverage targets of ocean protection. Conserv. Lett. Doi: https://doi.org/10.1111/conl.12247
3. Jones, G.P., Almany, G.R., Russ, G.R., Sale, P.F., Steneck, R.S., van Oppen, M.J.H., and Willis, B.T. (2009). Larval retention and connectivity among populations of corals and reef fishes: history, advances, challenges. Coral Reefs 28: 307–325.