

ASSESSMENT OF THE EXISTING MPA NETWORK WITHIN THE CORAL TRIANGLE

by

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ABSTRACT

This study identifies the present level of coral and mangrove protection existing in the Coral Triangle, utilizing current data from the Coral Triangle Atlas database and a process called “gap analysis,” which allows for the identification of underrepresented ecosystems and habitats. In addition, two different techniques to evaluate connectivity between existing MPAs were employed.

The unparalleled biodiversity of the Coral Triangle region, along with its importance to the people who live there, make it a rich and valuable resource that must be preserved. In response to mounting threats to these resources, President Susilo Bambang Yudhoyono of Indonesia proposed the *Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF)* in August 2007, calling for a multilateral partnership between the six Coral Triangle (CT6) countries. These six countries subsequently agreed to the *Regional Coral Triangle Initiative Plan of Action*, which sets five key goals and calls for the development of a region-wide network of marine protected areas (MPAs), to be established and fully functional by 2020. Up to date analysis of the changing levels of protection throughout the Coral Triangle is needed in order to measure progress and enable the CT6 countries to develop strategies to reach their conservation objectives on schedule.

The result of the current analysis demonstrates that while the connectivity between the majority of the MPAs in the Coral Triangle is sufficiently proximate to another reserve to facilitate larval exchange, only Timor-Leste has at least 20 percent of its coral reef area within no-take MPAs, and none of the six Coral Triangle countries have met the 20 percent target for mangrove forests. Clearly, the CT6 need to establish vast areas of new MPA networks, if they want to preserve coral and mangroves effectively. Malaysia, Papua New Guinea, the Solomon Islands, and the Philippines all need to increase the area of MPAs that coincide with the location of coral reef tracts, and each of the six countries need to do so with respect to mangrove forests.

INTRODUCTION

The Coral Triangle, also known as the “Amazon of the seas,” is regarded as the global epicenter of marine biodiversity (Zobor 2007). This region, situated at the equator, where the Western Pacific and Indian Oceans converge, covers a sea area between northern Australia and the southern tip of Asia of 5.7 million square kilometers (the equivalent of half of the United States) (Fidelman 2011; Foundation for Environmental Conservation 2009; World Wildlife Fund 2010). On the basis of two major criteria, coral and reef fish diversity, scientists define the boundaries of this region as encompassing all or parts of the exclusive economic zones of Indonesia (Central and Eastern), East Timor, the Philippines, Malaysia (part of Borneo), Papua New Guinea and the Solomon Islands (Foundation for Environmental Conservation 2009; World Wildlife Fund 2010).

The Coral Triangle encompasses only 1.6 percent of the planet’s ocean area, yet it has the highest coral diversity in the world. It contains 53 percent of the world’s coral reefs, with 76 percent of all known coral species represented (Foundation for Environmental Conservation 2009; The Nature Conservancy 2011; Veron et al. 2009). The Coral Triangle also has 37 percent of all currently identified species of coral reef fish and the world’s most extensive area of mangrove forests. These coral reef tracts stretch for hundreds of kilometers and serve as home, feeding ground and/or nursery to almost 40 percent of the world’s reef fish species (TNC 2011; World Wildlife Fund 2010). The unparalleled biodiversity of the Coral Triangle region, along with its importance to the people living in this region, make it a rich and valuable resource that must be preserved.

Heightened pressure on the marine and coastal resources of the Coral Triangle region has occurred as the result of increasing population size, economic development and

international trade. In response to mounting threats to these resources, President Susilo Bambang Yudhoyono of Indonesia proposed the *Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security* (CTI-CFF) in August 2007, calling for a multilateral partnership between the six Coral Triangle countries (subsequently referred to as the CT6). The six countries later agreed upon the *Regional Coral Triangle Initiative Plan of Action*, which calls for the development of a region-wide network of marine protected areas (MPAs) established and fully functional by 2020 in the Coral Triangle. In order to establish a representative network of MPAs, managers and decision makers must first have information on the current levels of protection throughout the Coral Triangle.

A process called “gap analysis” allows for the identification of underrepresented ecosystems and habitats. Gap analysis compares the distribution of important ecosystems or habitats with the location of protected areas (Jennings 2000; Scott 1993). This comparison points to habitats that remain poorly represented in protected areas and that should potentially become conservation priorities (Gleason et al. 2006; Scott 1993; Trisurat 2011; Weeks et al. 2009). Although gap analysis is still predominately used for terrestrial conservation planning, Gleason et al. (2006), Weeks et al. (2008) and Wood et al. (2008) have demonstrated its applicability to geospatial analysis in marine environments.

The development of a region-wide MPA network in the Coral Triangle should also take into account connectivity, although presently the design behind MPA delineation rarely aims to ensure connectivity between nearby protected areas. Connectivity refers to the movement of individuals between populations, which occurs in the oceans through the diffusion of planktonic larvae or propagules (Almany et al. 2009). Connectivity between MPAs has become increasingly recognized as a key conservation concern because it affects populations’ persistence and their capacity to recover from disturbances (Roberts et al. 2001). Designing

marine reserve networks must include decisions about MPA locations, size, and spacing, and adequately maintaining connectivity may require a consideration of larval dispersal distances (Almany et al. 2009). The spatial scale over which larval dispersal connects marine populations continues to generate debate (Planes et al. 2009). Data about how far larvae travel remains largely unavailable (McCook et al. 2009; Planes 2009). According to Shanks et al., data on the range of larval dispersal distances indicates that MPAs should occur within 20km of one another in order to exchange offspring effectively (2003).

METHODS

Data for this study was downloaded from the Coral Triangle Atlas website database (<http://ctatlas.reefbase.org/ctdataset.aspx>). The data required for analysis included vector data layers showing the distribution of coral and mangrove habitat within the Coral Triangle, the location of all marine protected areas, and the economic exclusive zones (EEZ) for each country in the CT6.

Gap Analysis

In ArcGIS 10.0, the MPA and the EEZ data layers were overlaid on the coral reef layer and the mangrove layer. Then the respective total areas of coral reef and mangrove forest habitats throughout the Coral Triangle region and the area of each habitat type contained within all CT MPAs were calculated. The area of each habitat within MPAs was divided by its corresponding total regional area, and this output was multiplied by 100 to calculate the percentage of the regional distribution of coral and mangrove habitat contained in MPAs. To meet the goal established in the *Regional CTI Plan of Action*, the percentages should equal twenty.

In addition to evaluating the level of protection coral reef and mangrove forests receive in the Coral Triangle region as a whole, all calculations described above were repeated for each

of the individual CT6 EEZs. For instance, the area of coral and mangrove habitat within all the MPAs of a particular EEZ were divided by the total area of each habitat within that EEZ.

Given that MPAs vary in the level of protection they afford, a second component of the gap analysis of MPAs within the Coral Triangle took into account their IUCN classifications. The *Regional CTI Plan of Action* sets a target of having 20% of each major marine and coastal habitat type in strictly protected “**no-take replenishment zones**” (Target I of Goal 3). Extractive use of marine resources in a protected area, including any kind of fishing, is inconsistent with the objectives of IUCN categories Ia, Ib and II (Dudley 2008). All Ia, Ib and II IUCN category MPAs were grouped together and counted as no-take protected areas (refer to Appendix for a complete list of the IUCN protected area categories and their definitions). The proportion of coral and mangrove habitat contained in MPAs of no-take conservation management status categories were then calculated. Finding such proportions reveals how closely the CT6 have come to reaching the RPOA target and whether they must extend the MPAs network.

Connectivity Analysis

Two different techniques were used to evaluate connectivity between existing MPAs and to validate the results. The first technique involved creating 10 km buffers around each MPA. Anywhere the buffers intersect indicates that the corresponding MPAs are located within 20 km of one another. Dissolving the buffer layer produced a new layer where the formerly intersecting buffer polygons now combined to form a single, continuous polygon. The original buffer layer was then intersected with the dissolved buffer layer. Where the buffer around an MPA did not overlap with any others, the polygons for the buffer layer and the dissolved buffer layer would be equivalent. Anywhere MPA buffers did overlap, the polygons for the buffer

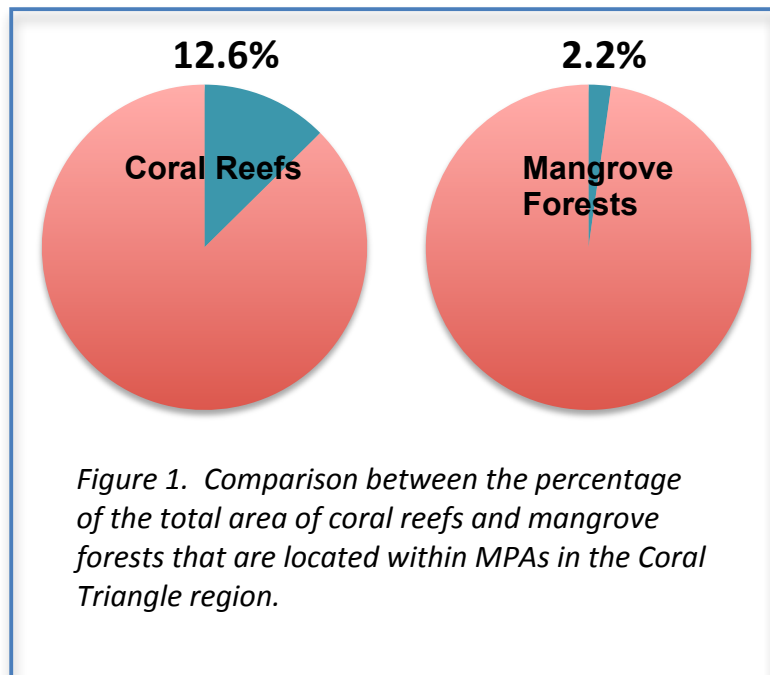
layer and the dissolved buffer layer would differ, which resulted in the creation of multiple attributes for the same area. In the attribute table of the resultant layer, the place where the FID numbers from the original buffer layer stopped increasing was determined. After this point, the remaining attributes were selected and exported. This process identified each MPA located within 20km of at least one other MPA. To eliminate duplicate attributes, the exported layer was joined to the MPA layer for the respective country.

The Aggregate Polygons function was the second technique used to combine MPAs within 20km of one another into new polygons. The Spatial Join function, specifying the Match Option as INTERSECT, was then utilized to transfer the attributes from the MPA layer of a particular country to the corresponding aggregate layer. The Match Option defines the criteria used by ArcGIS to match rows from the two layers. In this case only attribute information for MPAs that intersected with an aggregate polygon transferred.

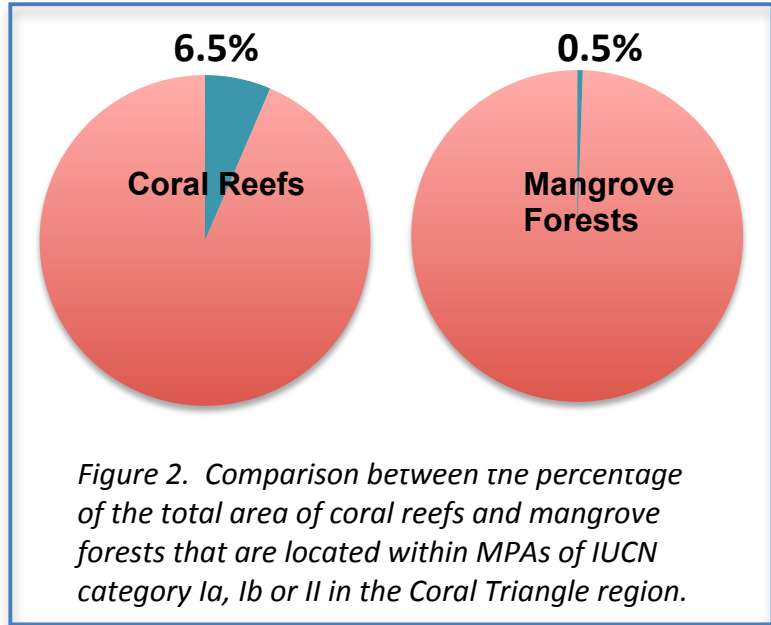
RESULTS

MPA Protection of Habitats

Taken together, the MPAs of the CT6 afford more protection to coral reefs than to mangrove forests. The MPAs in the Coral Triangle contain 12.6 percent of the coral reefs found throughout the region, whereas they contain only 2.2 percent of the mangrove forests (Figure 1). For both habitat



types, the percentage of area contained in MPAs drops by at least half when only IUCN categories of Ia, Ib and II are included (Figure 2). Only 6.5 percent of coral reef tracts in the Coral Triangle occur in MPAs classified as Ia, Ib or II and only .5 percent of mangrove forests.



For coral reefs, meeting the 20 percent target means the CT6 must protect a combined total area of 7374.77 km² within MPAs. Currently, the system of MPAs in the Coral Triangle falls significantly short of this target, containing only 12.6 percent of the coral in the region. The MPAs contain only 2.2 percent of the mangrove forests found in the Coral Triangle; not nearly enough meet the 20 percent target of the RPOA.

Indonesia

The CT6 vary broadly in the number and size of their respective MPAs. Indonesia has the largest Exclusive Economic Zone (EEZ) of the CT6 and covers the largest proportion of the Coral Triangle region. Indonesia also has the largest proportion of coral reefs within the Coral Triangle. Roughly forty percent of the coral reefs in the Coral Triangle region are located in Indonesian (Figure 3). It has a total of 14825.67

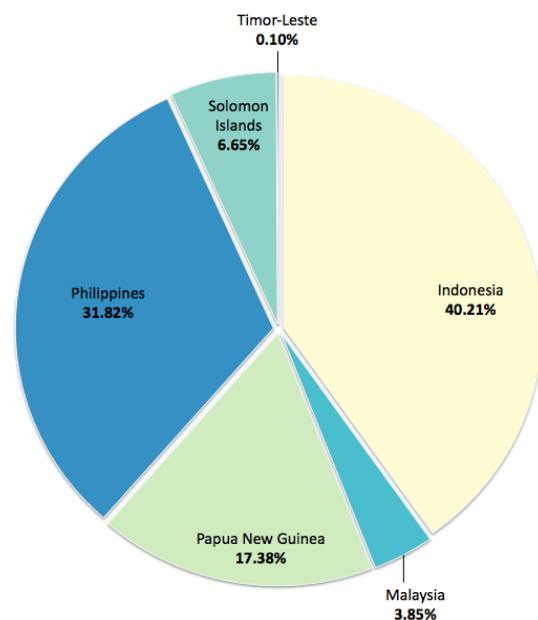


Figure 3. Percentages of the total coral reef area for the Coral Triangle region broken down by country.

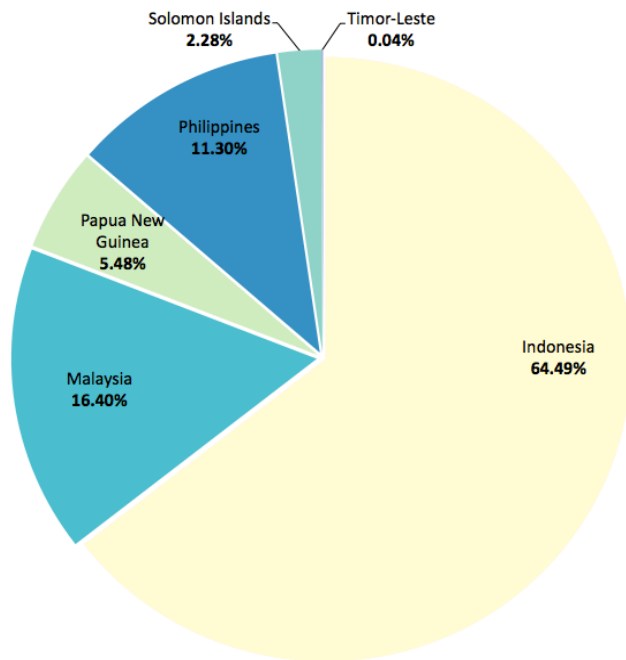


Figure 4. Percentages of the total mangrove forest area for the Coral Triangle region broken down by country.

km² of the coral reefs that occur within the Coral Triangle and 28.7 percent of that habitat (4257.57 km²) occurs within the boundaries of MPAs (Figure 5). The percentage drops to 15.8 percent of coral when only no-take MPAs, of IUCN category Ia, Ib or II, are included in calculations.

Of the CT6, Indonesia also has the greatest area of mangrove forests. It has a total area of 14616.44 km² of mangrove forests, which equates to 64.5 percent of the total area that occurs within the Coral

Triangle (Figure 4). Far from the RPOA target of 20 percent, Indonesia has only 2.5 percent of its mangroves within MPAs (Figure 6). The percentage of mangrove forests within MPAs of category Ia, Ib, or II equals 0.8.

Malaysia

Malaysia has 3.9 percent Coral Triangle's total coral reef area. Only 1.6 percent (22.87 km²) of this small area is protected within MPAs. The percentage drops only slightly to 1.5 after excluding all but no-take MPAs. By contrast to the relatively low abundance of coral, Malaysia has 16.4 percent of the Coral Triangle's mangrove forests, second only to Indonesia in area. None of the mangroves of Malaysia exist within MPAs, however.

Papua New Guinea

Papua New Guinea has 17.4 percent or the third largest area of coral reefs in the Coral Triangle. A mere 1.1 percent of its coral sits within MPAs. None of the coral is in an MPA of IUCN category Ia, Ib or II. Papua New Guinea has only 5.5 percent of the mangrove forests found in the Coral Triangle. The percentage of mangroves within MPAs equals 0.4 and the percentage for no-take MPAs equals zero.

Philippines

The Philippines have 31.8 percent of the region's total coral area. MPAs currently protect only 2.3 percent of this coral. No-take MPAs encompass merely 0.1 percent of the total coral.

With 11.3 percent of the mangrove forests in the Coral Triangle region, the Philippines have the third greatest area of mangrove compared to the other members of the CT6. Of the total 2562.14 km² of mangrove forests that occur in the EEZ of the Philippines, 5.3 percent is located within MPAs, but none located within no-take MPAs.

Solomon Islands

In total, coral covers 2451.65 km² around the Solomon Islands, but no more than .6 percent of it is found in MPAs. None of the coral reefs occur in no-take MPAs. The Solomon Islands also have a relatively small proportion of the mangrove forests distributed throughout the Coral Triangle region. The Solomon Islands have 517.32 km² of the Coral Triangle's mangroves, which corresponds to 2.3 percent of the regional total. A mere 0.1 percent of these mangroves fall within the boundaries of an MPA, but none of the MPAs have an IUCN classification of Ia, Ib or II.

Timor-Leste

Timor-Leste has 0.1 percent of the region's total coral area. By having 31.2 percent of its coral within MPAs, Timor-Leste has more than met the objective of 20 percent protection, mandated in the RPOA. All of the MPAs containing coral reef also have IUCN category designations of Ia, Ib or II.

Timor-Leste likewise has a relatively small proportion of the regional mangrove area. The country has 0.04 percent of the area of the entire Coral Triangle. Unlike coral reefs, which coincide well with MPAs, no mangroves occur in MPAs.

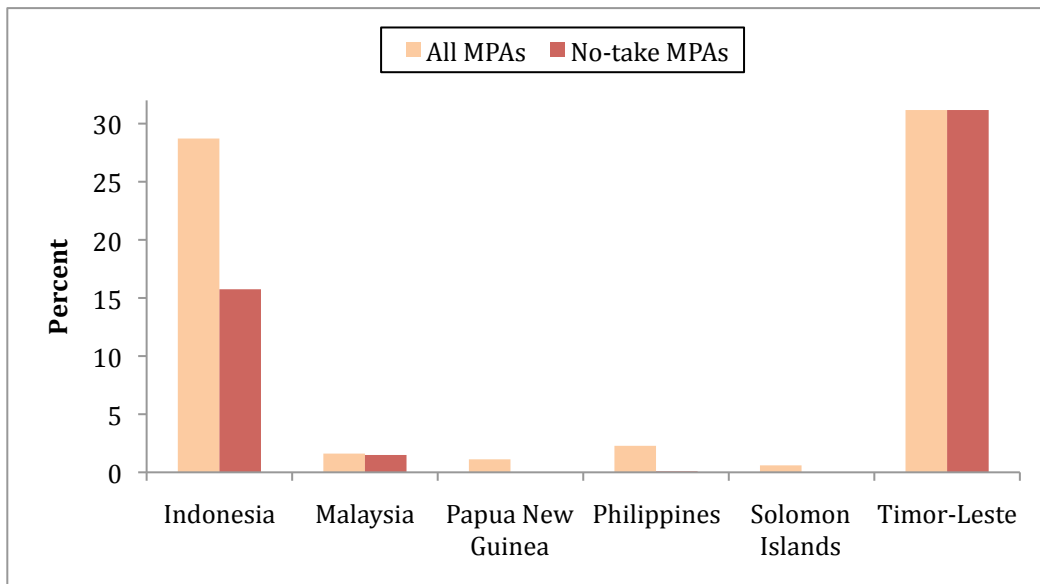


Figure 5. Graph shows the percentage of the total area of coral reefs contained in all MPAs and in MPAs classified as IUCN category Ia, Ib or II in as symbolized in peach and red respectively.

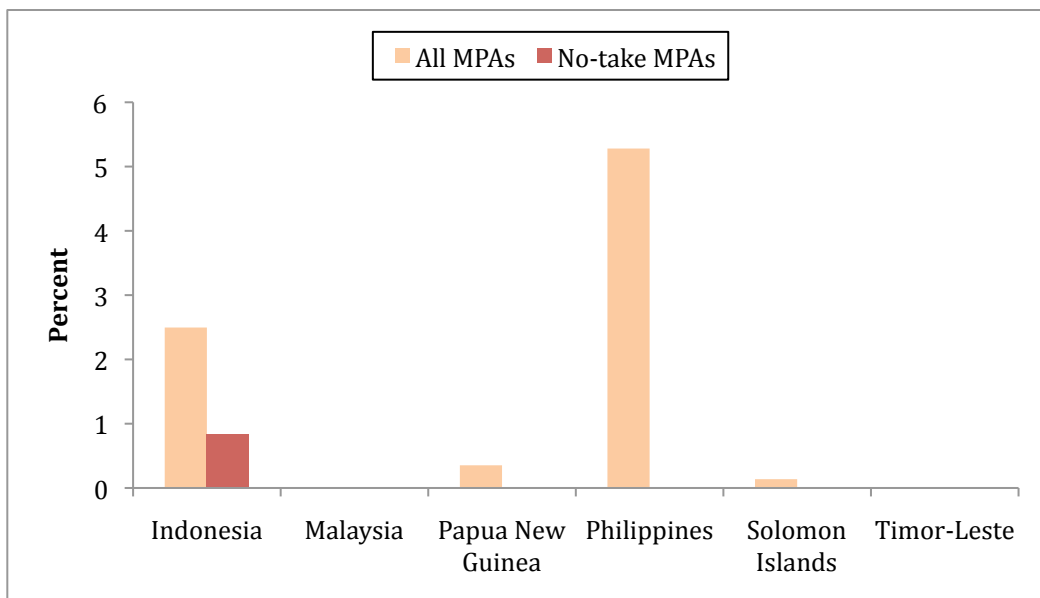


Figure 6. Graph shows the percentage of the total area of mangrove forests contained in all MPAs and in MPAs classified as IUCN category Ia, Ib or II in as symbolized in peach and red respectively. 9

	INDONESIA	MALAYSIA	PAPUA NEW GUINEA	PHILIPPINES	SOLOMON ISLANDS	TIMOR-LESTE
All MPAs						
Total area (km ²)	14825.67	1419.16	6407.13	11735.07	2451.65	35.14
Total area (km ²) in MPAs	4257.57	22.87	71.61	267.66	14.68	10.95
Reefs in MPAs	28.72%	1.61%	1.12%	2.28%	0.60%	31.17%
MPAs of IUCN Category Ia, Ib or II						
Total area (km ²) in "no-take" MPAs	2334.95	21.18	0.00	10.03	0.00	10.95
Reefs in "no-take" MPAs	15.75%	1.49%	0.00%	0.09%	0.00%	31.17%

Table1. Area and percentage of coral reefs contained in all MPAs and in "no-take" MPAs (those with IUCN classifications of Ia, Ib, or II) respectively, organized by country.

	INDONESIA	MALAYSIA	PAPUA NEW GUINEA	PHILIPPINES	SOLOMON ISLANDS	TIMOR-LESTE
All MPAs						
Total area (km ²)	14616.44	3716.78	1242.80	2562.14	517.37	8.64
Total area (km ²) in MPAs	364.83	0.00	4.38	135.29	0.71	0.00
Mangroves in MPAs	2.50%	0.00%	0.35%	5.28%	0.14%	0.00%
MPAs of IUCN Category Ia, Ib or II						
Total area (km ²) in "no-take" MPAs	122.68	0.00	0.00	0.00	0.00	0.00
Mangroves in "no-take" MPAs	0.84%	0.00%	0.00%	0.00%	0.00%	0.00%

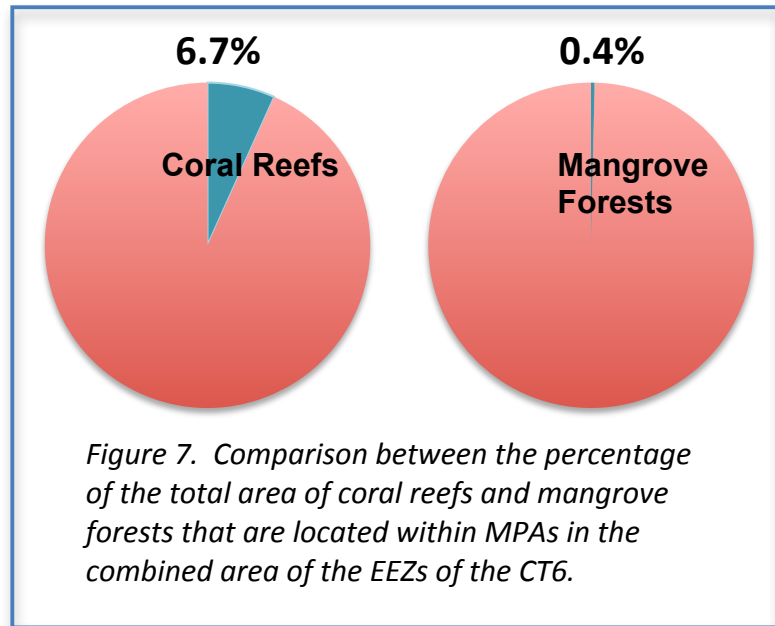
Table2. Area and percentage of mangrove forests contained in all MPAs and in "no-take" MPAs (those with IUCN classifications of Ia, Ib, or II) respectively, organized by country.

MPA Protection Beyond the Boundary of the Coral Triangle

As the CT6 work to meet the goals of the RPOA, they will likely not confine their conservation efforts to the boundaries of the Coral Triangle Region. Many of the CT6 have EEZ boundaries that extend beyond the border of the Coral Triangle. Given that important coral

reef and mangrove forest habitats are also located throughout the EEZs of each of CT6 it makes sense to conduct a gap analysis across this larger study area.

As shown in Figure 7, the CT6 have protected 6.7% of coral reefs and 0.4% of mangrove forests throughout the combined



area of their respective jurisdictions. As individual countries, Indonesia and Timor-Leste have protected the largest proportions coral reef area within MPAs (Table 3). Nearly thirty-five percent of the coral reefs found in Indonesia’s EEZ occur within MPAs and nearly 31% for Timor-Leste. The Solomon Islands and Papua New Guinea have the smallest proportions of coral reef habitat protected (3.8% and 6.6% respectively).

	INDONESIA	MALAYSIA	PAPUA NEW GUINEA	PHILIPPINES	SOLOMON ISLANDS	TIMOR-LESTE
Total area (km ²)	19804.98	1646.28	7123.76	11837.42	2801.61	35.04
Total area (km ²) in MPAs	6925.13	177.10	472.59	1629.24	107.54	10.80
Reefs in MPAs	34.97%	10.40%	6.63%	13.70%	3.84%	30.72%

Table3. Area and percentage of **coral reefs** contained in MPAs for the entire EEZ of each of the CT6.

Together the CT6 have only 0.4% of mangrove forests within MPAs. Individually, Indonesia is the only country with more than 5% of its mangrove habitat located in MPAs. Malaysia, Papua New Guinea, the Solomon Islands and Timor-Leste all have roughly 2% or less of their mangrove forests protected within MPAs (Table 4). Mangrove forests currently remain

much less well-protected than coral reefs both within the Coral Triangle and throughout the EEZs of the CT6.

	INDONESIA	MALAYSIA	PAPUA NEW GUINEA	PHILIPPINES	SOLOMON ISLANDS	TIMOR-LESTE
Total area (km ²)	27910.17	9236.58	4836.87	2574.16	462.83	9.20
Total area (km ²) in MPAs	3818.84	20.14	105.80	107.40	3.63	0.13
Mangroves in MPAs	13.68%	0.22%	2.19%	4.17%	0.78%	1.42%

Table4. Area and percentage of **mangrove forests** contained in MPAs for the entire EEZ of each of the CT6.

MPA Connectivity

A large majority of the MPAs within the Coral Triangle (78.3%) lie within 20km of at least one other MPA. When evaluated by country, the Philippines, at 88.8%, have the greatest proportion of MPAs located within 20km of one or more other MPAs. Papua New Guinea, the Solomon Islands and Malaysia likewise each have more than 80 percent of their MPAs situated within 20km of another MPA. Indonesia by contrast only has 53 percent of its MPAs within 20km of at least one other MPA (Figure 7 and Table 5).

	INDONESIA	MALAYSIA	PAPUA NEW GUINEA	PHILIPPINES	SOLOMON ISLANDS	TIMOR-LESTE
Total Number of MPAs	166	49	39	344	50	1
Number of MPAs within 20km of at least 1 other MPA	87	41	34	304	42	N/A
MPAs within 20km of at least 1 other	52.41%	83.67%	87.18%	88.83%	84.00%	N/A

Table5. The number and proportion of MPAs within at least 20km of at least one other MPA.

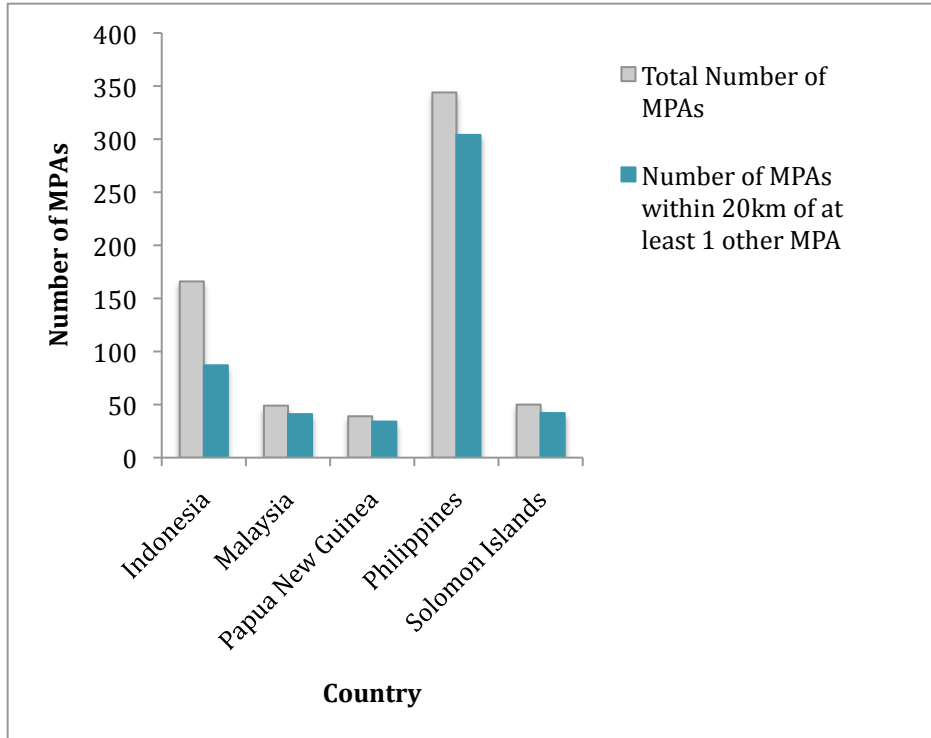


Figure 7. Graph shows the number of MPAs that lie within 20km of the boundary of at least one other MPA. NOTE: Timor-Leste only has one MPA, making this analysis unnecessary.

DISCUSSION

According to the results of this study, only Timor-Leste has at least 20 percent of its coral reef area within no-take MPAs, and none of the six countries have met the 20 percent target for mangrove forests. Regarding the distance parameters established by Shanks et al., the majority of the MPAs in the Coral Triangle are located in close enough proximity with another reserve to facilitate larval exchange (2003).

From a methodological standpoint, the limitations of a gap analysis include the lack of consideration of MPA distributional patterns, population viability and ecological integrity (Jennings 2000). Data on viability such as habitat quality, species abundance, and population trends remains lacking for much of the Coral Triangle. Establishing a comprehensive network of MPAs, though, requires taking into account the conditions of the surrounding areas that

could impinge upon the protected areas; if external factors put too much stress on the MPAs, it will compromise their capacity to meet conservation objectives (Weeks et al. 2009).

MPAs act as islands of protection, but when the sea around these protective oases becomes degraded, the marine resources within an MPA are put at risk. The scenario of toxic pollutants, which travel from afar, transgress the boundaries of an MPA and damage the species and ecosystems within, represents the most common example of an external factor jeopardizing the efficacy of an MPA. Other sources of degradation of areas surrounding MPAs include noise pollution, the effects of eutrophication and ecological imbalances arising of resource extraction. Degradation or destruction of important associated habitats surrounding MPAs can also have negative consequences for the health of protected target ecosystems. Of particular significance to this study, for instance, the deforestation of mangroves means that coral reefs species lose important associated nursery grounds (Agardy 2011). Despite the fact that coral reef tracts in some of the CT6 currently enjoy a level of protection that meets the standards set in the *RPOA*, mangroves remain poorly protected, which could compromise the health of the coral reefs. To disregard the context in which an MPA sits not only potentially compromises the local marine biodiversity and ecosystem services but also wastes the time and resources spent protecting the area. Not considering the area surrounding an MPA is clearly economically inefficient, but also may undermine the confidence of the public and decision-makers in the ability of conservation managers to oversee and protect marine areas. Another limitation of this study is that the distance between MPAs alone does not determine the strength of connectivity. The distances travelled by larvae arise as the complex result of the biology of the particular species, the time of spawning, settlement, and numerous oceanographic processes. The topology of the benthic habitat and the velocity and spatiotemporal variability of ocean currents can greatly affect how larvae of the same species

disperse (Planes et al. 2009). For instance, through modeling of population connectivity, Trembl et al. found significant spatial and temporal variability for the ocean currents throughout the Pacific. As models of larval dispersal continue to become more sophisticated, it will remain important to use them to inform MPA network design and planning. Nevertheless, the analysis presented in this study represents a straightforward means of evaluating connectivity, which has become increasingly recognized as a key component of marine conservation and management efforts. Shanks, et al. also suggested, based on their study of larval dispersal, that MPAs be four to six kilometers in diameter, which they maintained is large enough to capture the larvae of short-distance dispersers. As a next step, conducting an analysis of MPA size would further strengthen this study.

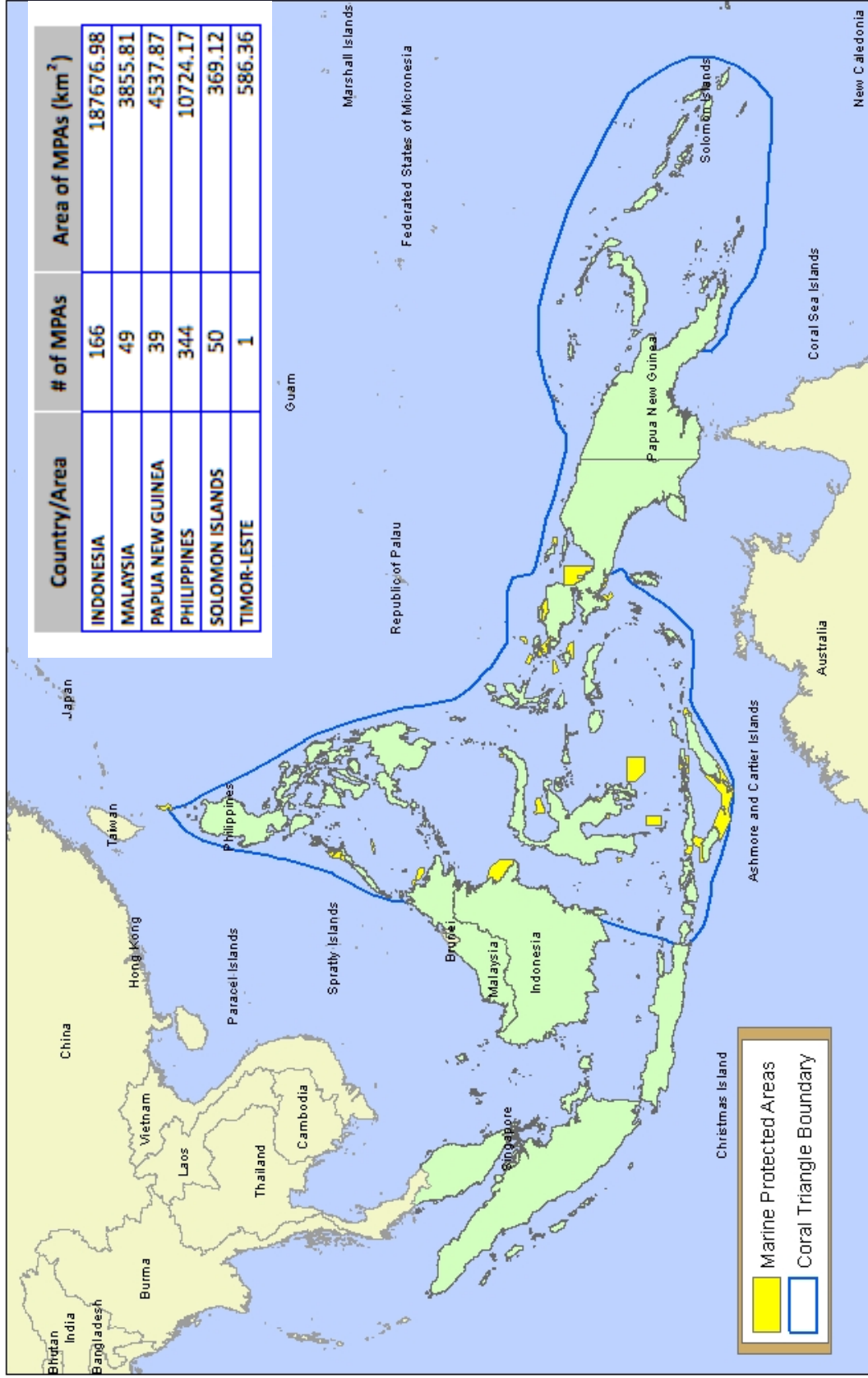
CONCLUSIONS

The result of the current analysis demonstrates that only one of the six Coral Triangle countries (Timor-Leste) has at least 20 percent of its coral reef area within no-take MPAs, and none of the CT6 countries have met the 20 percent target for mangrove forests. The majority of the MPAs in the Coral Triangle are located in close enough proximity with another reserve to facilitate larval exchange, however. Clearly, the CT6 need to establish vast areas of new MPA networks, if they want to preserve coral and mangroves effectively. Malaysia, Papua New Guinea, the Solomon Islands, and the Philippines all need to increase the area of MPAs that coincide with the location of coral reef tracts, and each of the six countries need to do so with respect to mangrove forests.

ACKNOWLEDGEMENTS

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Marine Protected Areas Coral Triangle Region



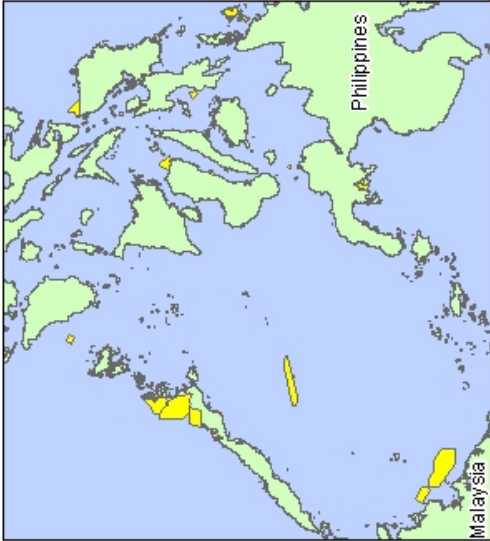
Country/Area	# of MPAs	Area of MPAs (km ²)
INDONESIA	166	187676.98
MALAYSIA	49	3855.81
PAPUA NEW GUINEA	39	4537.87
PHILIPPINES	344	10724.17
SOLOMON ISLANDS	50	369.12
TIMOR-LESTE	1	586.36

Coordinate System: World Cylindrical Equal Area
 Projection: Cylindrical Equal Area
 Datum: WGS 1984

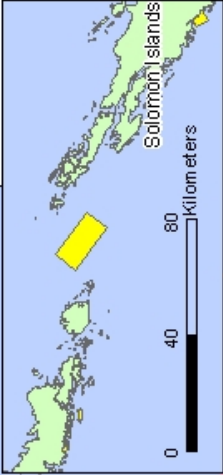
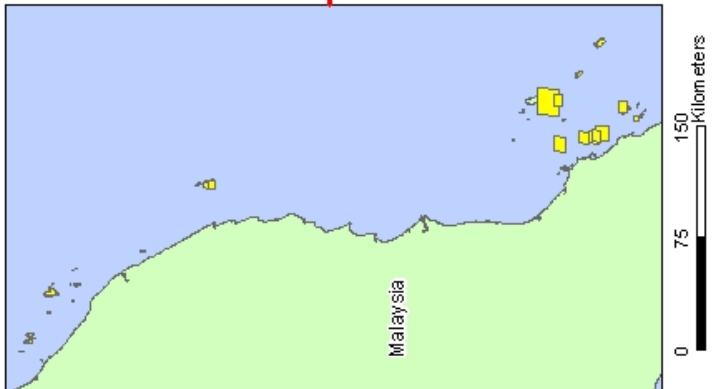
Marine Protected Areas: Coral Triangle Region



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SOLOMON ISLANDS	50	369.12
TIMOR-LESTE	1	586.36



Marine Protected Areas
 Coral Triangle Boundary



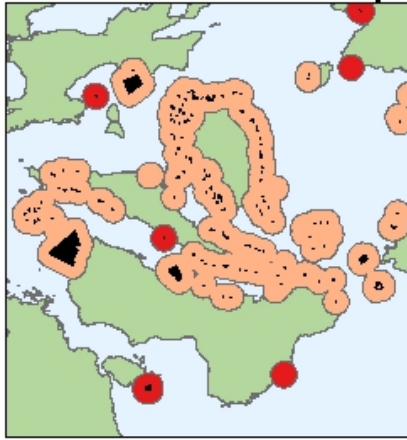
Kristiana Erikson
June 14, 2011

Coordinate System: World Cylindrical Equal Area
 Projection: Cylindrical Equal Area
 Datum: WGS 1984

Connectivity between Marine Protected Areas Coral Triangle Region

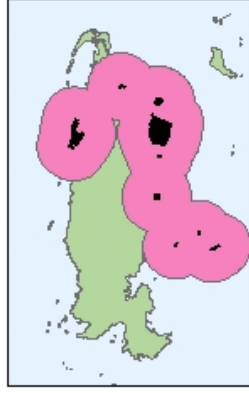


0 75 150 Kilometers

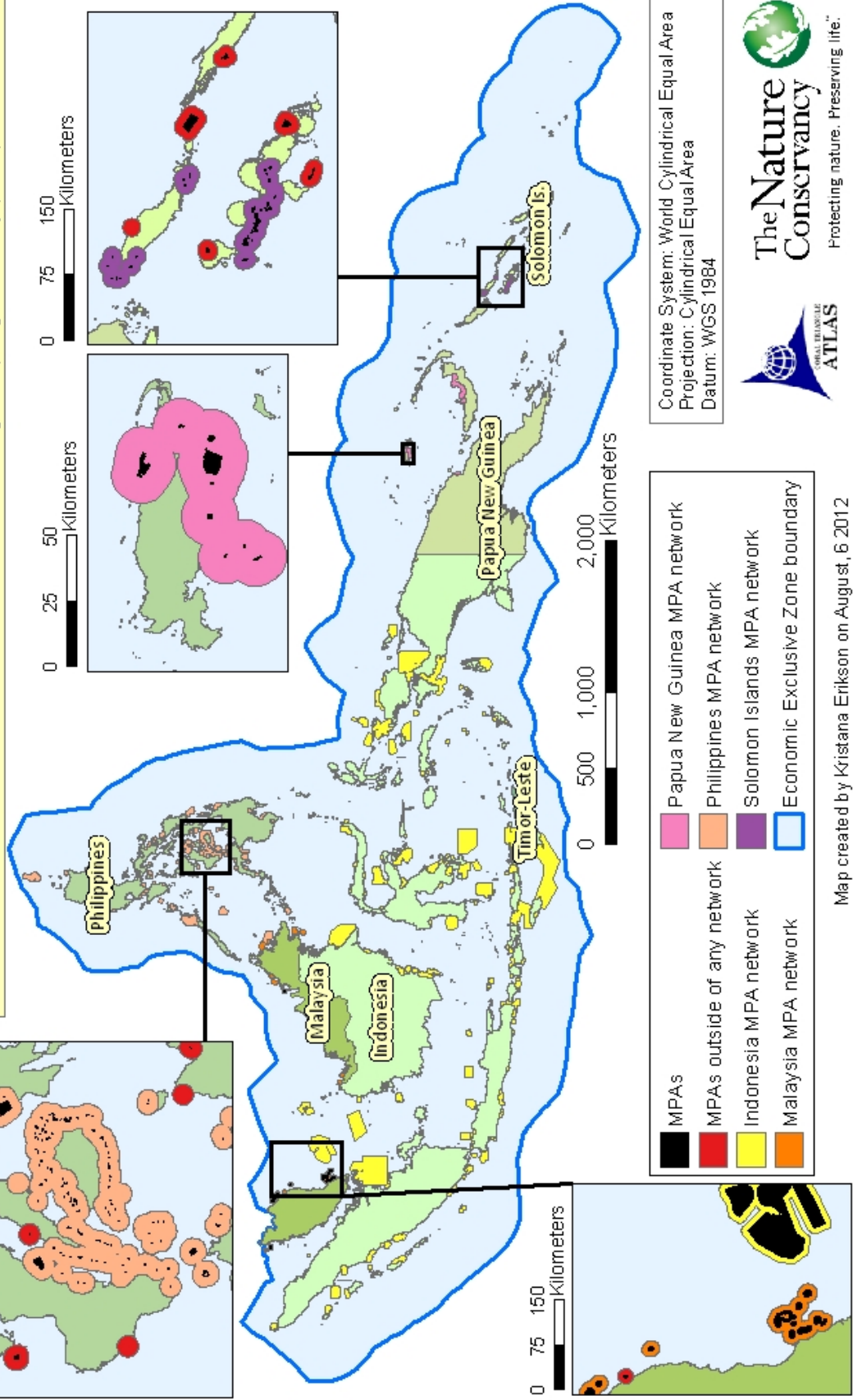
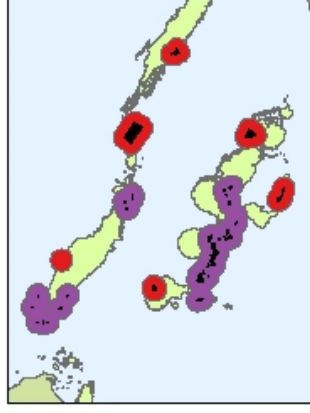


Connectivity between MPAs has become increasingly recognized as a key conservation concern because it affects populations' persistence and their capacity to recover from disturbances (Roberts et al. 2001). According to Shanks et al., data on the range of larval dispersal distances indicates that MPAs should occur within 20km of one another in order to exchange offspring effectively (2003).

0 25 50 Kilometers



0 75 150 Kilometers



- MPAs
- MPAs outside of any network
- Indonesia MPA network
- Malaysia MPA network
- Papua New Guinea MPA network
- Philippines MPA network
- Solomon Islands MPA network
- Economic Exclusive Zone boundary

Coordinate System: World Cylindrical Equal Area
Projection: Cylindrical Equal Area
Datum: WGS 1984



Map created by Kristiana Erikson on August, 6 2012

APPENDIX I

IUCN Protected Area Category Definitions

Category Ia: Strict nature reserve

Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring.

Category Ib: Wilderness area

Category Ib protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

Category II: National Park

Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.

Category III: Natural monument or feature

Category III protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.

Category IV: Habitat/species management areas

Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

Category V: Protected landscape/seascape

A protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

Category VI: Protected area with sustainable use of natural resources

Category VI protected areas conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.

APPENDIX 2

The Five Goals of the Regional Coral Triangle Initiative Plan of Action

- Goal 1: “PRIORITY SEASCAPES” DESIGNATED AND EFFECTIVELY MANAGED: Large-scale geographies prioritized for investments and action, where best practices are demonstrated and expanded
- Goal 2: ECOSYSTEM APPROACH TO MANAGEMENT OF FISHERIES (EAFM) AND OTHER MARINE RESOURCES FULLY APPLIED
- Goal 3: MARINE PROTECTED AREAS (MPAs) ESTABLISHED AND EFFECTIVELY MANAGED
Target 1: Region-wide Coral Triangle MPA System (CTMPAS) in place and fully functional.
- Goal 4: CLIMATE CHANGE ADAPTATION MEASURES ACHIEVED
- Goal 5: THREATENED SPECIES STATUS IMPROVING
Target 1: Improved status of sharks, sea turtles, seabirds, marine mammals, corals, seagrass, mangroves and other identified threatened species

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