Purposive Data collection and sharing for Biodiversity Conservation and Reporting in the ASEAN Region

SGVergara
Biodiversity Information Management
ASEAN Centre for Biodiversity

ASEAN CENTRE FOR BIODIVERSITY

Background

- Estimates of the Biodiversity of the ASEAN region indicate that it is worth 3 trillion US Dollars

- ACB was established to help ASEAN member states to protect and conserve their unique biodiversity

- ACB facilitates regional and global cooperation on the conservation and sustainable use of biodiversity

- ACB's main mandate its to address alarming biodiversity loss in the region, enhance common understanding and find solutions through regional cooperation
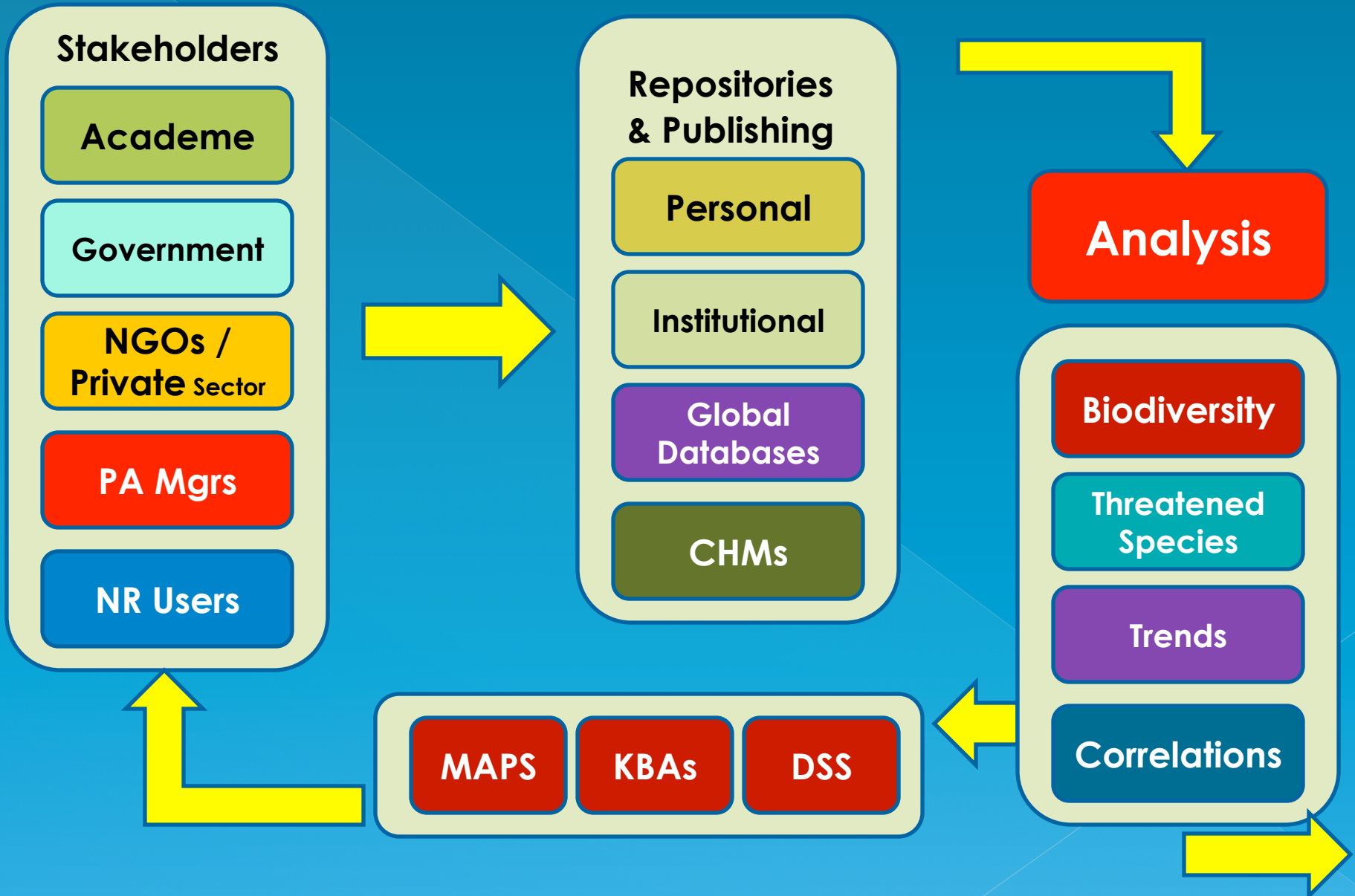
Information Sharing Concerns

- Availability of biodiversity – related information

- Uneven communications and information technology capacity in the ASEAN region

- Benefits of information exchange are not largely realized

- Communication flow and knowledge-sharing strategies

- Consistency of information contributions from AMS (content, form, timeliness)

- Harmonization and standards on information

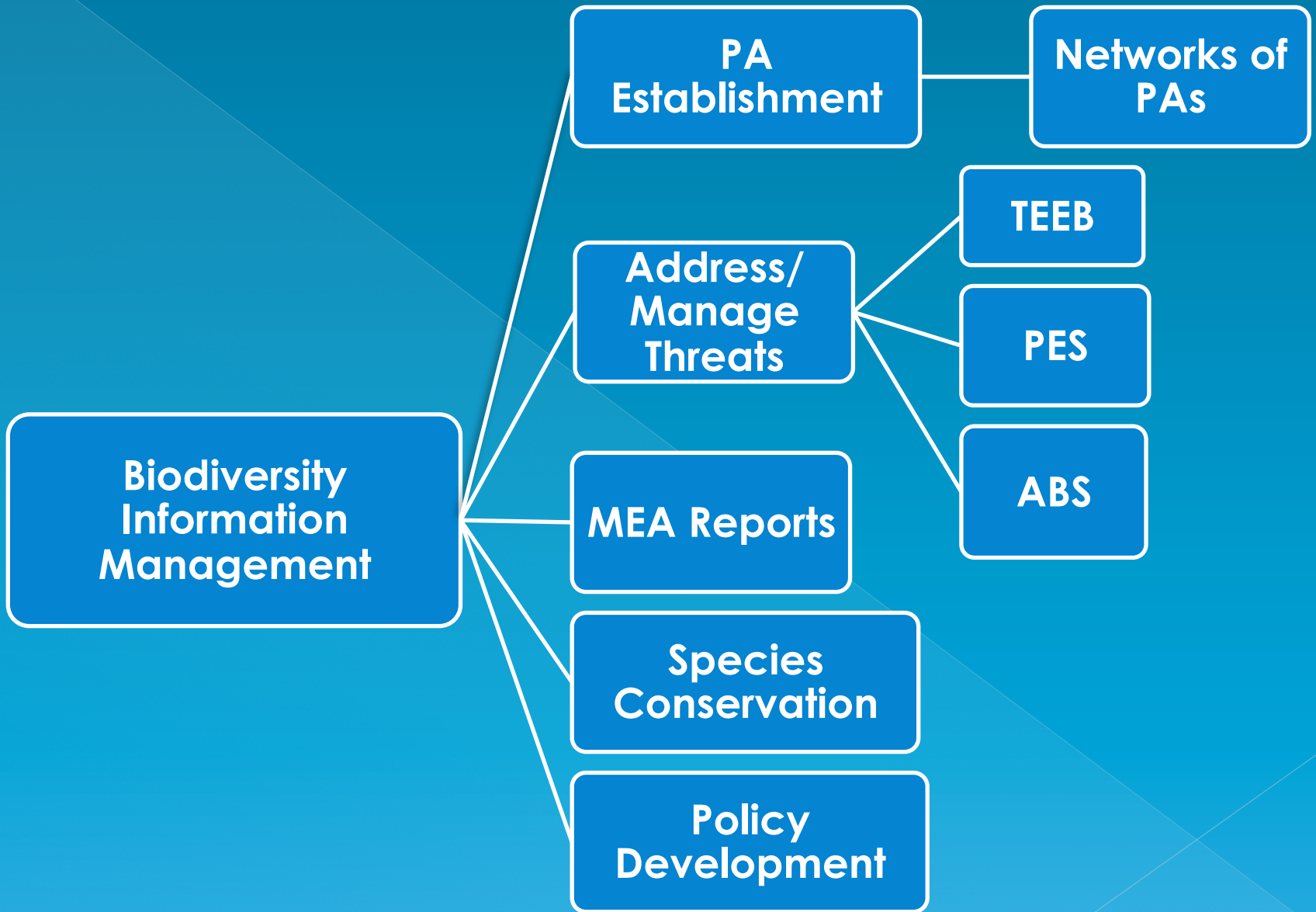- Willingness to share information

Progress

- Data contributions from Malaysia (plants), Thailand (insects), FishBase (SEAsia collection)
- Species and PA database structures were since adopted by Brunei, Myanmar & Philippines in their CHM
- Training on digitization of species and protected areas
- The common use of the COL as the species backbone was reported in the Philippines
- MOA with GBIF signed, ACB Database Programmer trained in data publishing

Biodiversity Information Management

Stakeholders
- Academe
- Government
- NGOs / **Private** Sector
- PA Mgrs
- NR Users

Repositories & Publishing
- Personal
- Institutional
- Global Databases
- CHMs

Analysis
- Biodiversity
- Threatened Species
- Trends
- Correlations

MAPS   KBAs   DSS

Aichi Targets and some observation datasets

Target	Observation Datasets	Monitoring Methods	ACB Activities
6. Sustainable exploitation of marine resources.	Reported landings	National Censuses; Survey reports, Min / Bureau of Fisheries	MPA Gap Analysis; MPA Networks Proposal
	Survey reports on Sources of pressures: trends in the use of destructive fishing techniques; land-based sources	Trends; monitoring	
	Population and extinction risk trends of target and by-catch species	Surveys	
	CPUE; MSY	Surveys and statistics	
	Status of ecosystems / habitats	Status of Vulnerable Marine Ecosystems (VMEs)	
	Marine Protected Areas	Coverage and Effectiveness;	

AT 1, 6. Protected areas of the ASEAN (in km^2)

Country	Terrestrial[1]		Wetlands[2]		Coastal/Marine[1]	
	Yr. 2000	Yr. 2010	Yr. 2000	Yr. 2010	Yr. 2000	Yr. 2010
Brunei Darussalam	2,623	2,623	-	-	44	44
Cambodia	41,770	47,034	546	546	78	84
Indonesia	258,342	269,774	2,427	6,565	34,019	65,975
Lao PDR	38,433	38,433	0	148	-	-
Malaysia	59,978	60,045	384	1,342	2,555	2,555
Myanmar	30,082	42,639	0	3	476	476
Philippines	32,136	32,454	684	684	16,453	16,754
Singapore	31	32	-	-	9	9
Thailand	103,155	104,024	5	3,728	4,804	4,804
Viet Nam	19,898	20,568	120	258	974	3,281

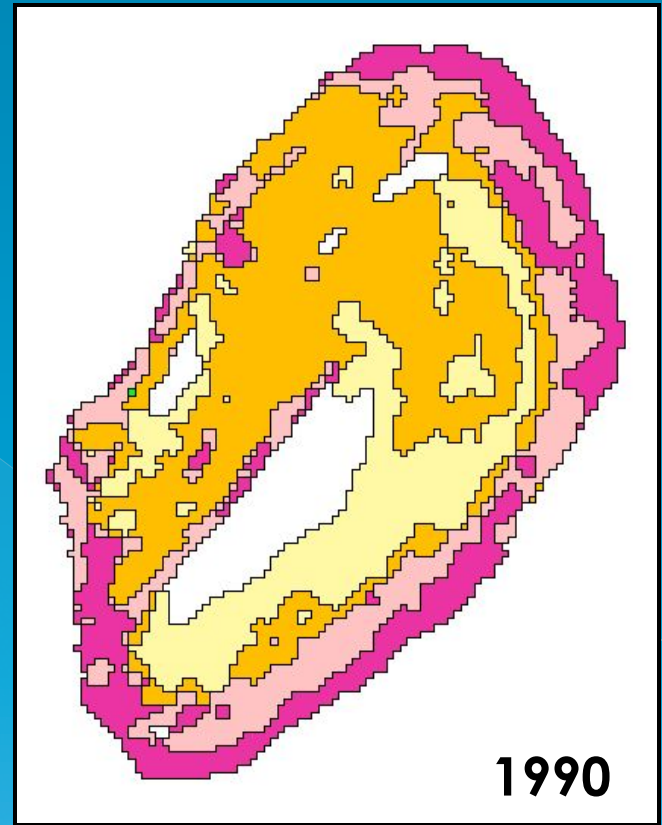[1] IUCN and UNEP-WCMC (2011) The World Database on Protected Areas (WDPA): January 2011. Cambridge, UK: UNEP-WCMC.

[2] Ramsar-listed wetlands

How and how much are our ecosystems changing?

Ecosystem maps compared through time

- Use remote sensing information to monitor ecosystem changes thru time
- Policy reference
- PA prioritization at the national and local levels
- MEA Reporting

Coral
Dead coral
Masked out
Rubble
Sand

1990

Target	Observation Datasets Certifications and Changes in management practices	Monitoring
7. Biodiversity-friendly agriculture, forestry and aquaculture. By 2020 **areas under agriculture, aquaculture and forestry are managed sustainably**, ensuring conservation of biodiversity.	Proportion of commercially harvested forests that are certified as sustainably managed	Area of commercially harvested forests certified
	Proportion of agricultural production with eco- or bio-farming certification (including aquaculture)	Area of agri/aqua prod with certification
	Changes in agricultural and aquaculture management practices (AMPs) & activities (e.g., enhanced diversity in production systems, low tillage, low input agriculture, pollination management, adherence to technical standards e.g. for sea cages etc.)	Trends in agri and aqua culture practices
	Area planted under GMOs with recognized ecological impacts	
	Changes in the practices and use of pesticide and herbicide	Volumes of pesticide, herbicide and fertilizer usage and areas under use of these; Incidence of pesticide and herbicide resistance/tolerance
	Population trends of farmland and forest specialist species	

Trends in forest and selected crops areas, 1980-2007, ASEAN
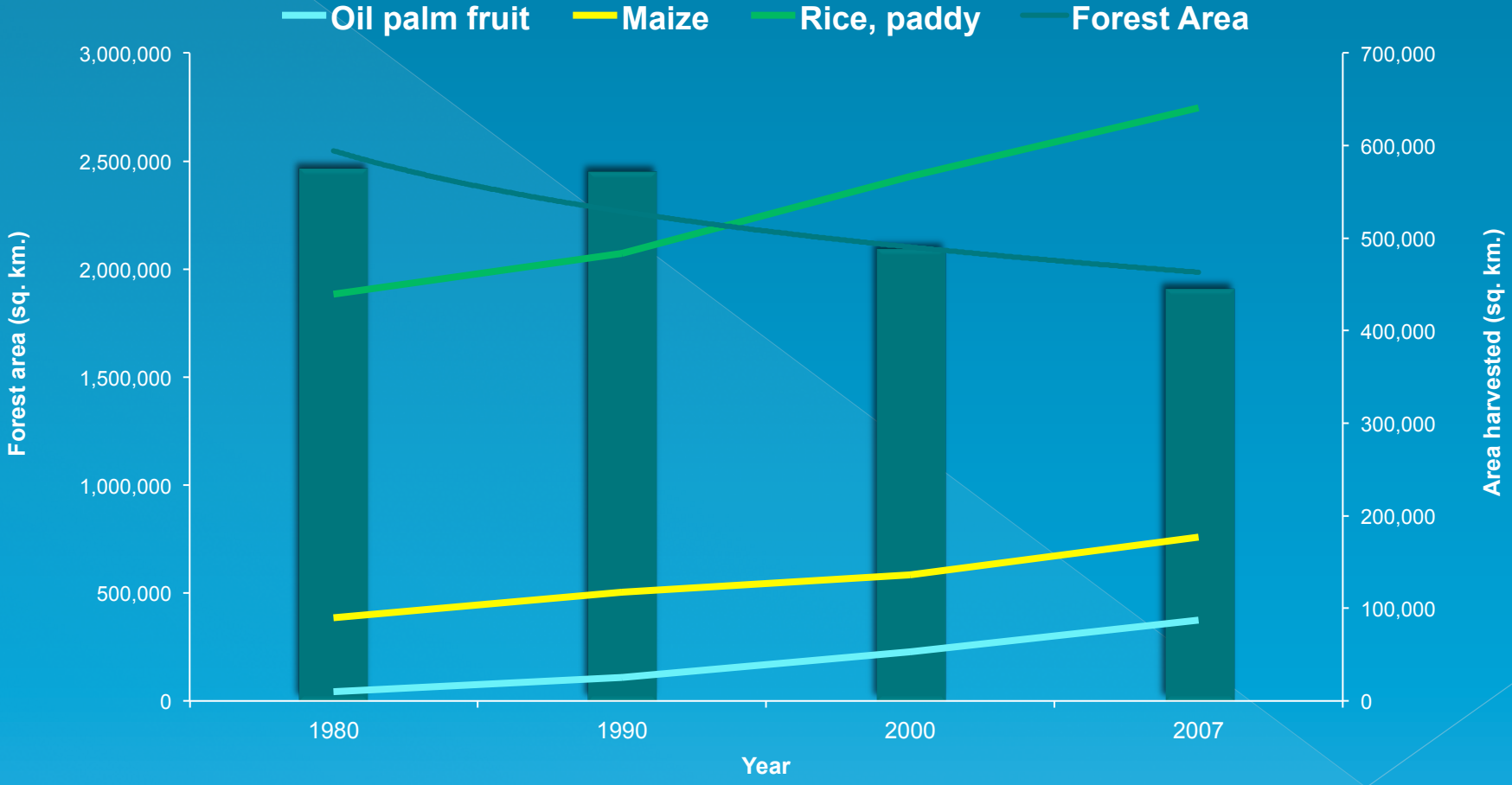
Sources of data: ASEAN Biodiversity Outlook 2010
FAOSTAT 2011. Accessed 24Nov2011

Trends in mangrove forest and fishpond areas, 1980-2005, PHILIPPINES
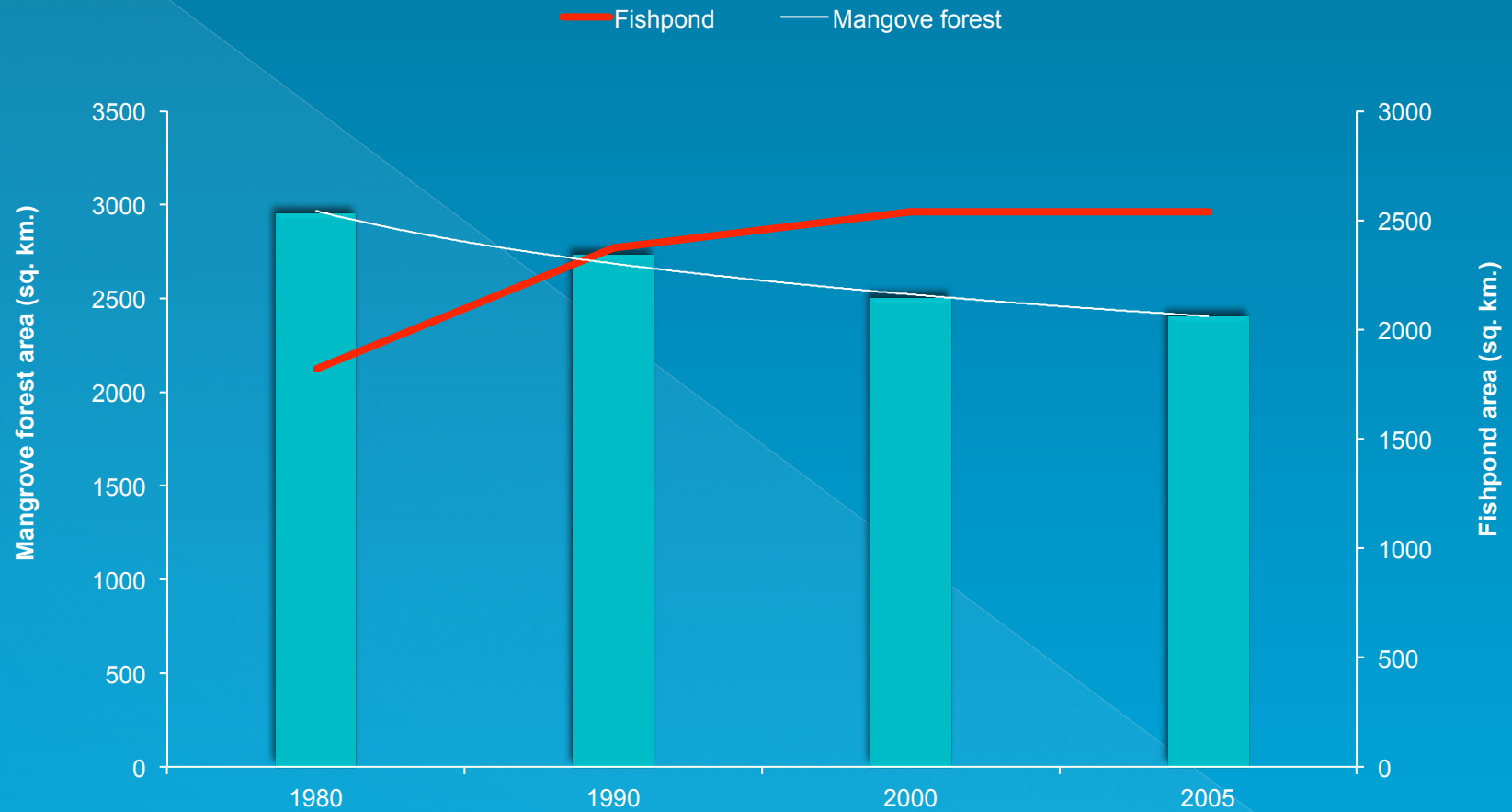
Sources of data:

1. ASEAN Biodiversity Outlook 2010.

2. Philippines Bureau of Fisheries and Aquatic Resources. Philippine Fisheries Profiles. Accessed on 25 November 2011 at http://www.bfar.da.gov.ph/pages/AboutUs/maintabs/publications/publications.html

Target	Observation Datasets	Monitoring
9. Control of invasive alien species. By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their	Reports of incidences and extents of invasiveness	Distribution patterns and their changes
	Trends	Populations; Species extinctions
	IAS – relevant policiies	IAS-relevant international policy adoption; IAS-relevant national policy adoption
	Control of priority species	Pathway management
	IAS expertise/ capacity and research investment	Projects
	Ballast Water	Adoption of practices on the mgt of Ballast Water (treatment practices, etc)

AT 9. Invasive Species in the ASEAN Region

Kingdom	Genus	Species	Source Country / Region	AMS Invaded	Impacts Recorded	Reference (Source)

Potentially Invasive Species from the ASEAN Region

Kingdom	Genus	Species	Country Invaded	Locality Recorded	Impacts Documented	Reference (Source)

Trends / changes in distribution patterns

Decapterus maruadsi

Photo of *Decapterus maruadsi* by K.T. Shao

Reef-associated; highly commercial

Slide from Christine Casa
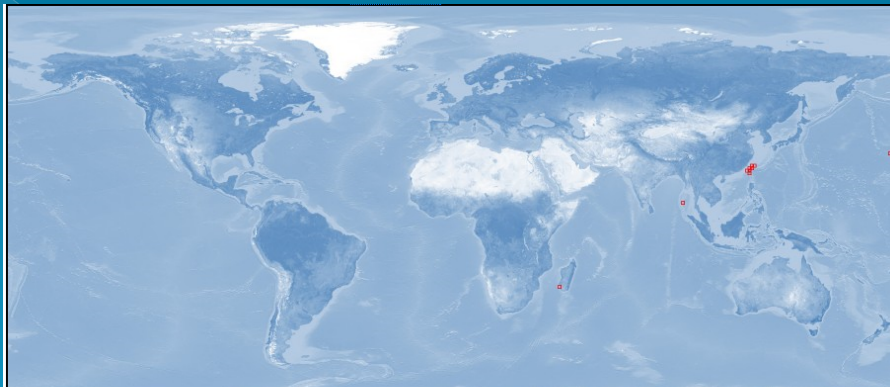
Point map of *Decapterus maruadsi*
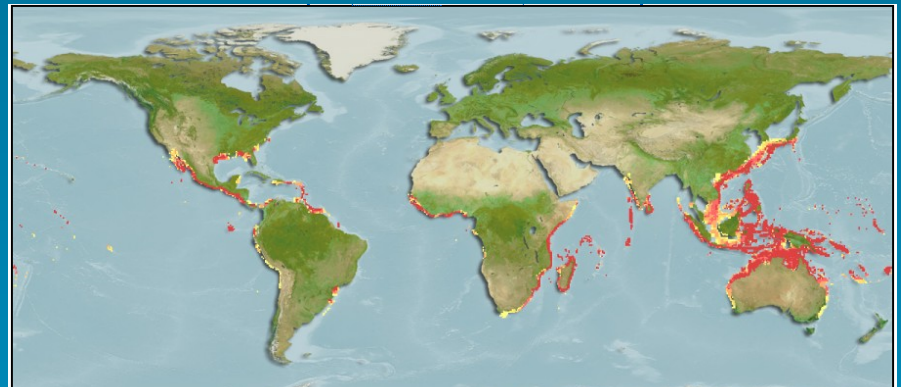
Suitable habitat of *Decapterus maruadsi*

Relative probabilities of occurrence
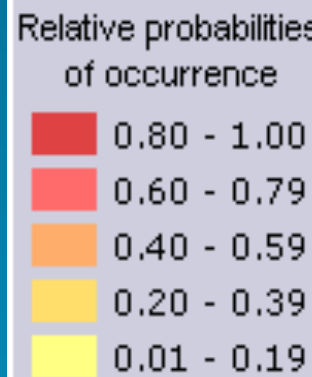
■	0.80 – 1.00
■	0.60 – 0.79
■	0.40 – 0.59
■	0.20 – 0.39
■	0.01 – 0.19
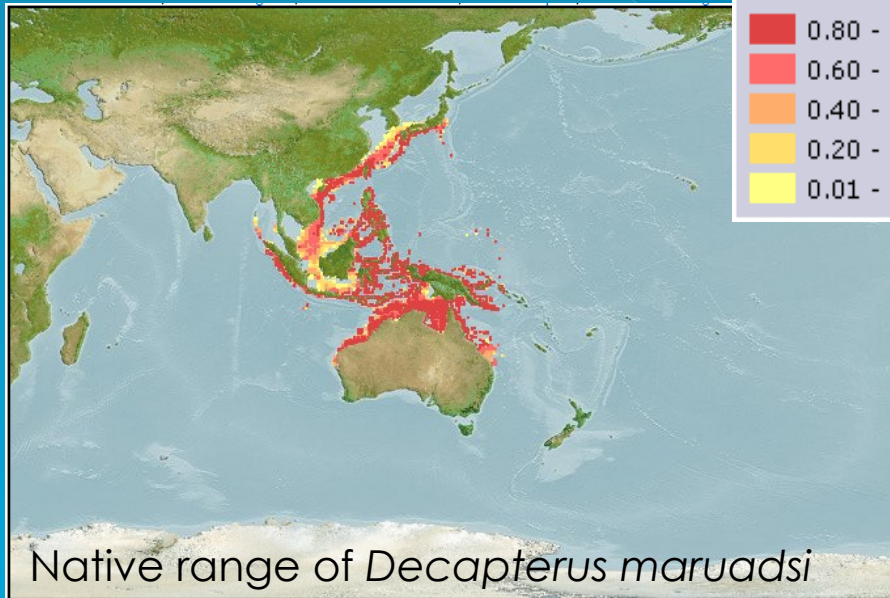
Native range of *Decapterus maruadsi*
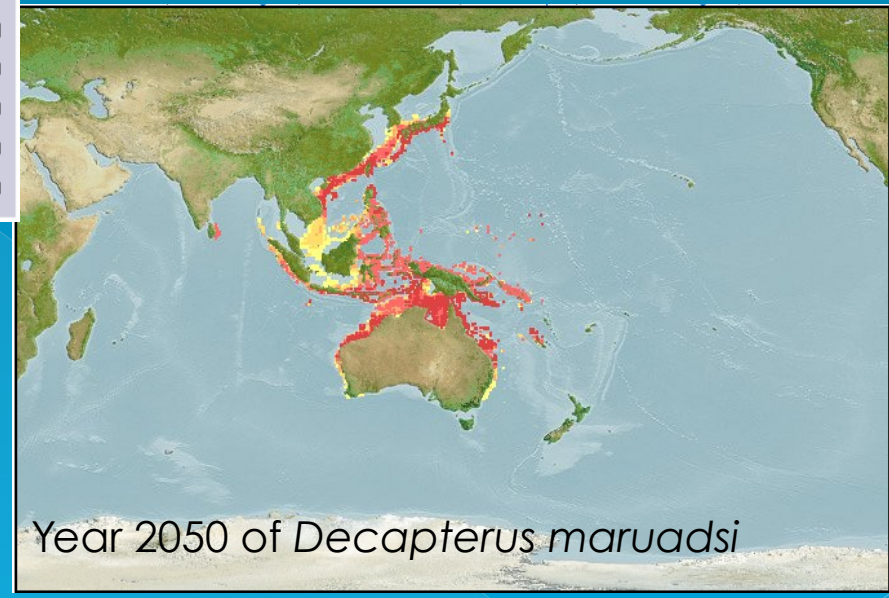
Year 2050 of *Decapterus maruadsi*

AquaMaps is an approach to generating model-based, large-scale predictions of currently known natural occurrence of marine species

From Christine Casal

Caranx ignobilis (Talakitok)
Reef-associated; brackish; marine

Ref: Aquamaps in FishBase.org

Relative probabilities of occurrence

■	0.80 - 1.00
■	0.60 - 0.79
■	0.40 - 0.59
■	0.20 - 0.39
■	0.01 - 0.19

Native Range

Suitable Habitat

Point Map

Year 2050 Range

Target	Observation Datasets	Monitoring	ACB Activities
10. Coral reefs and other vulnerable ecosystems. By 2015, the multiple **anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized**, so as to maintain their integrity and functioning.	Physical Parameters	e.g. Sea surface temperature, pH, salinity, water level, intrusion, habitat losses	ABO
	Hard & soft coral cover	LCC; Bleaching incidences and extents of associated coral mortality (%LCC), indicator species; coral diseases	
	Threats, pressures	Occurrence and impacts of pollution, nitrification, sedimentation, fishing, poaching, destructive fishing, and socioeconomic indicators	
	Acidification	Changes in ph, Impacts on corals, molluscs (calcification rates)	Species Database
	Community composition & interactions	Migration patterns, changes in species composition	

How vulnerable are marine resources to Climate Change?

Figure 21. Overlay of species diversity of reef-building sleractinian corals on surface temperature map.
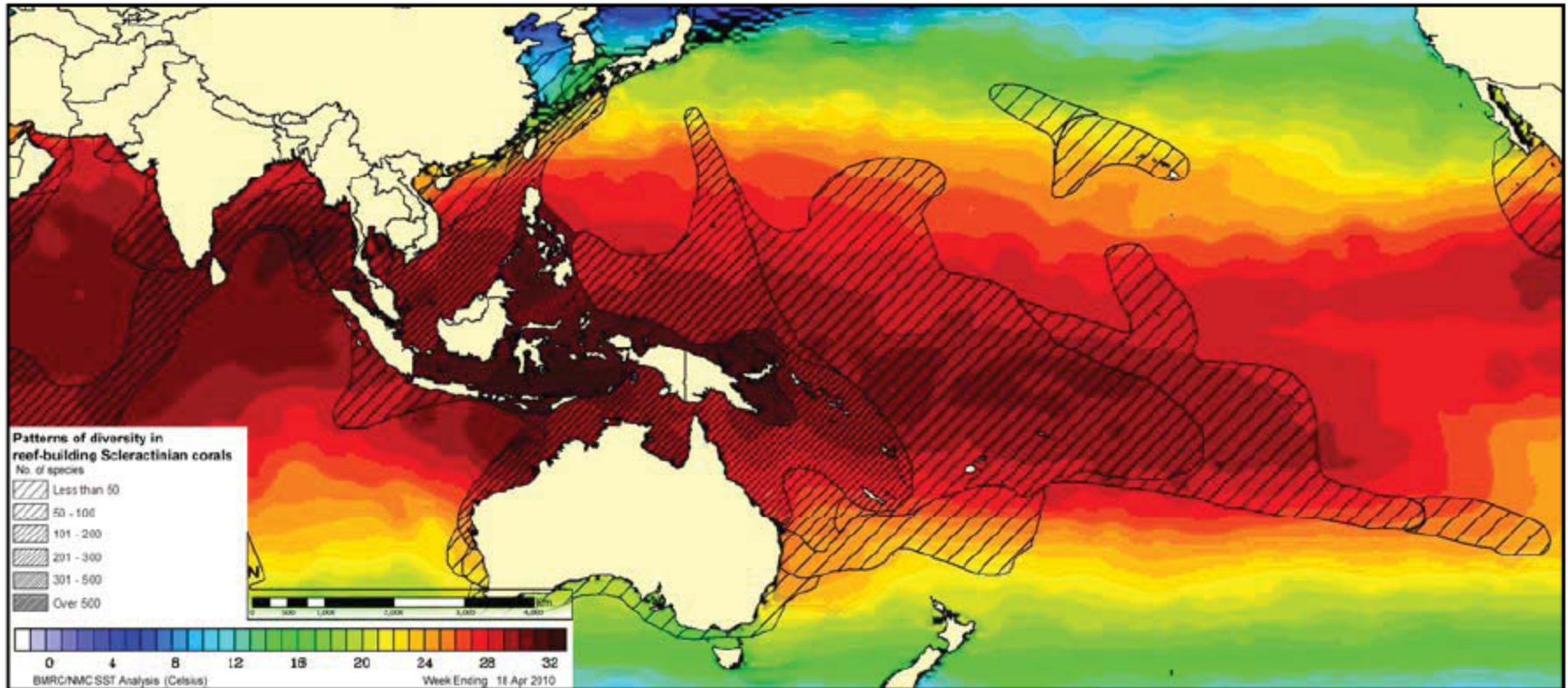
Source: Base layer: Bureau of Meteorology Research Centre, Australia. Sea Surface Temperature – April 2010.
Data layer: J.E.N. Veron and Mary Stafford-Smith. 2000. Corals of the World.

Sea surface temp and coral reefs in the ASEAN
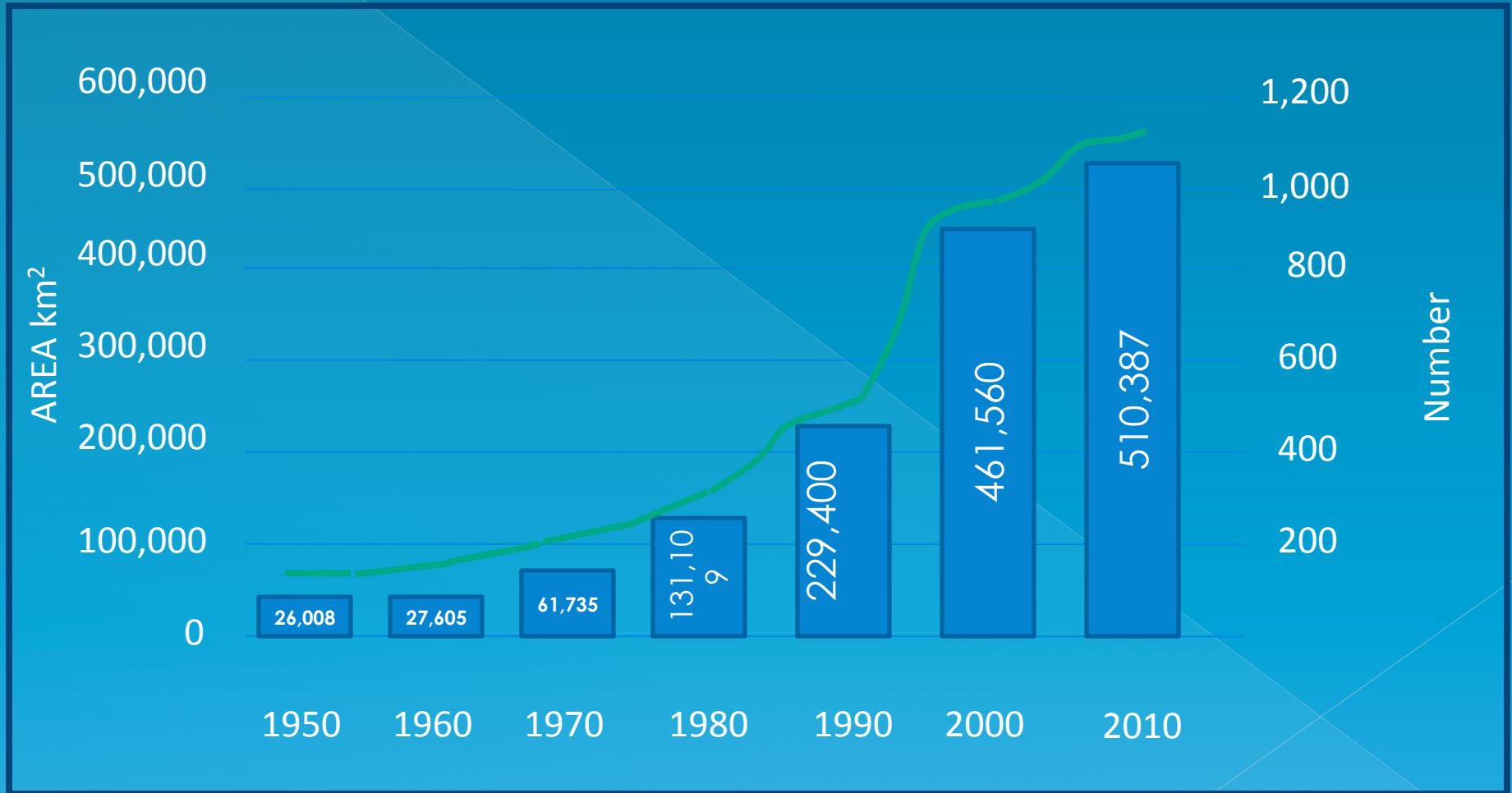
Summary of Threats (ABO)

- Dependence on timber, fuel wood, forest products, and the conversion of forests into agricultural and industrial lands, have resulted to a loss of 555,587 square kilometers of forests between 1980 and 2007

- ASEAN suffers the highest rates of mangrove losses in the world, 628 square kilometers of mangrove were stripped away each year, aggregated decline of 26 percent, within a 25-year period.

- General decline in coral reefs in the ASEAN region between 1994 and 2008, rate of loss at 40 percent.

- Seagrasses are threatened with human-induced development Indonesia, (Philippines, Singapore and Thailand) experienced from 30 up to 50 percent losses of seagrass habitats

- The ASEAN region remains challenged in delivering progress towards addressing the drivers of biodiversity loss, <u>particularly in preventing invasive alien species, addressing the impact of biodiversity loss to species and ecosystems, and abating pollution and the exploitation of forests and wetlands.</u>

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

Target	Observation Datasets	Monitoring	ACB Activities
11. Protected areas. By 2020, at least **17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, are conserved through well connected systems of protected areas**	Protected Areas and areas of importance for biodiversity and ecosystem services	Coverage in terrestrial, marine and freshwater environments; ID -KBAs, IBAs	Species database; Data management; PA database; Training, CHMs
	Management effectiveness	**- Legal instrument**	
	Site-based trends	- Management Body	
		- Management Plan	
		- With Policy	
	Biodiversity trends	- Financing	
	PA management	- Adequate Capacity	
		- Enforcement	
	Ecological representativeness and integration into wider landscapes/seascapes	- Monitoring and Evaluation diversity across systems (marine, terrestrial and freshwater)	
	Connectivity	habitat fragmentation and between site connectivity	

AT 1, 5,11. Growth in area and number of designated protected areas in the ASEAN region, 1950-2010

Protected areas of the ASEAN (in km^2)

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[1] IUCN and UNEP-WCMC (2011) The World Database on Protected Areas (WDPA): January 2011. Cambridge, UK: UNEP-WCMC.

[2] Ramsar-listed wetlands

How do we prioritize conservation?
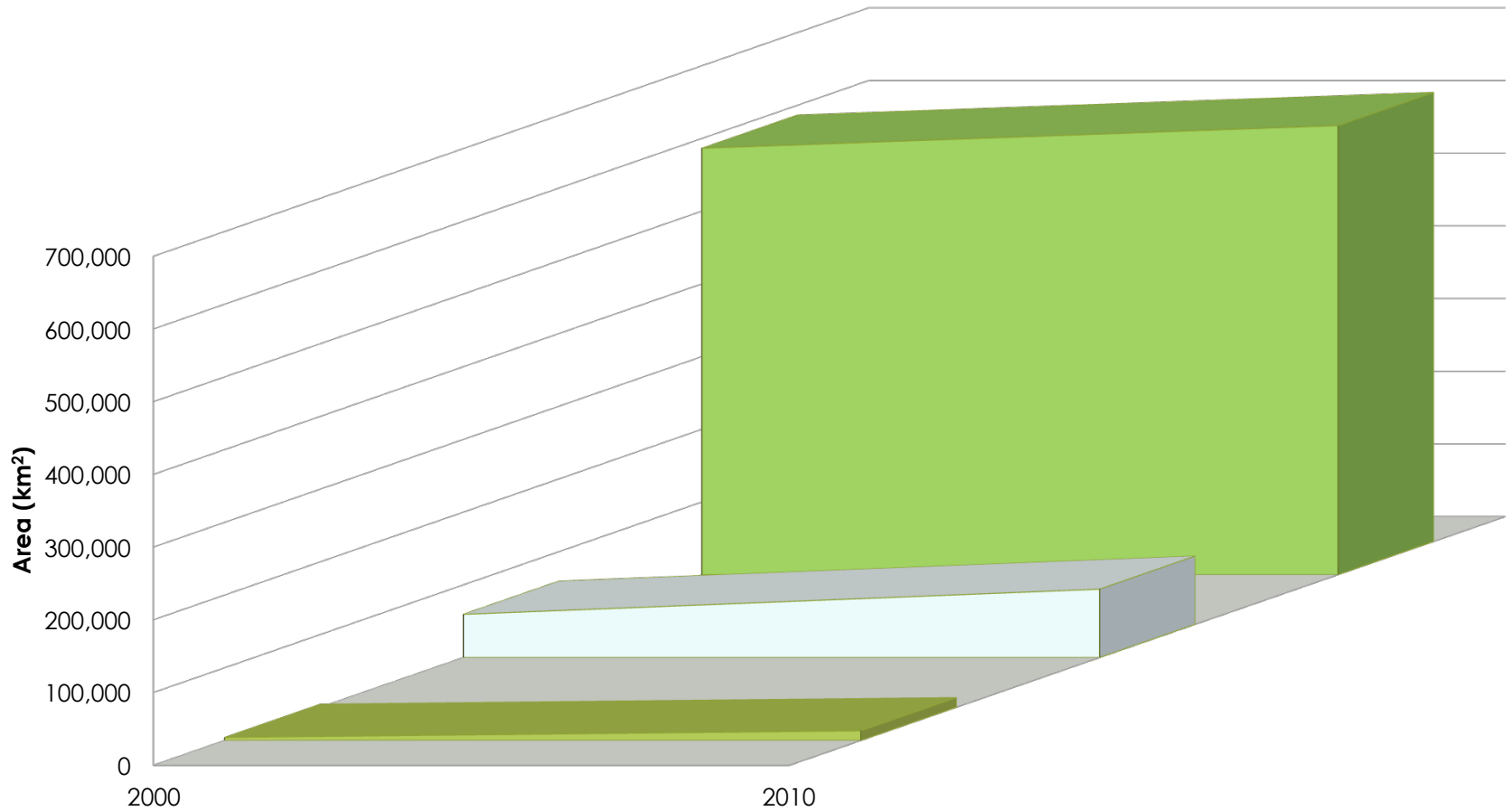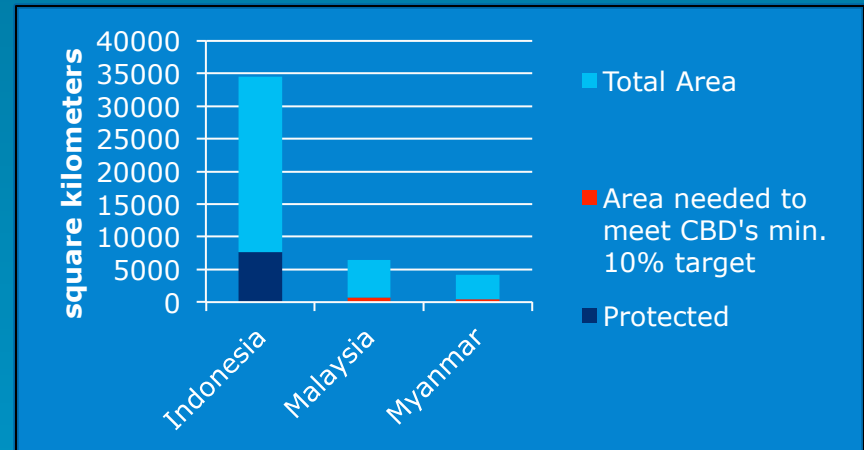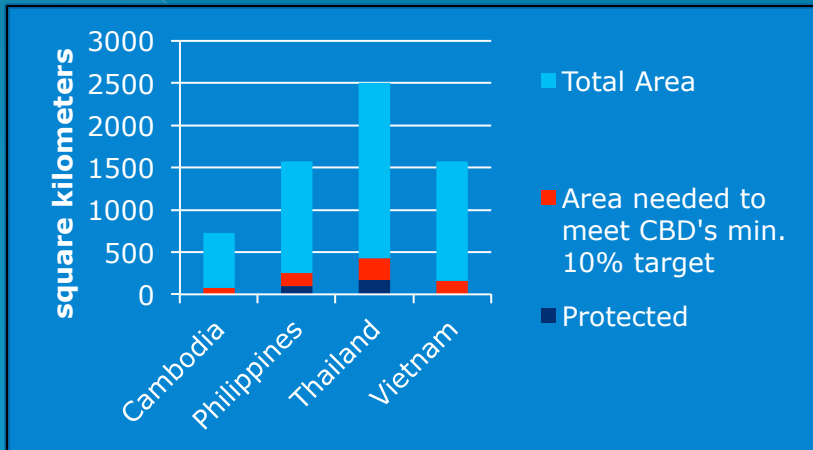
Ramsar Efforts in ASEAN Member States
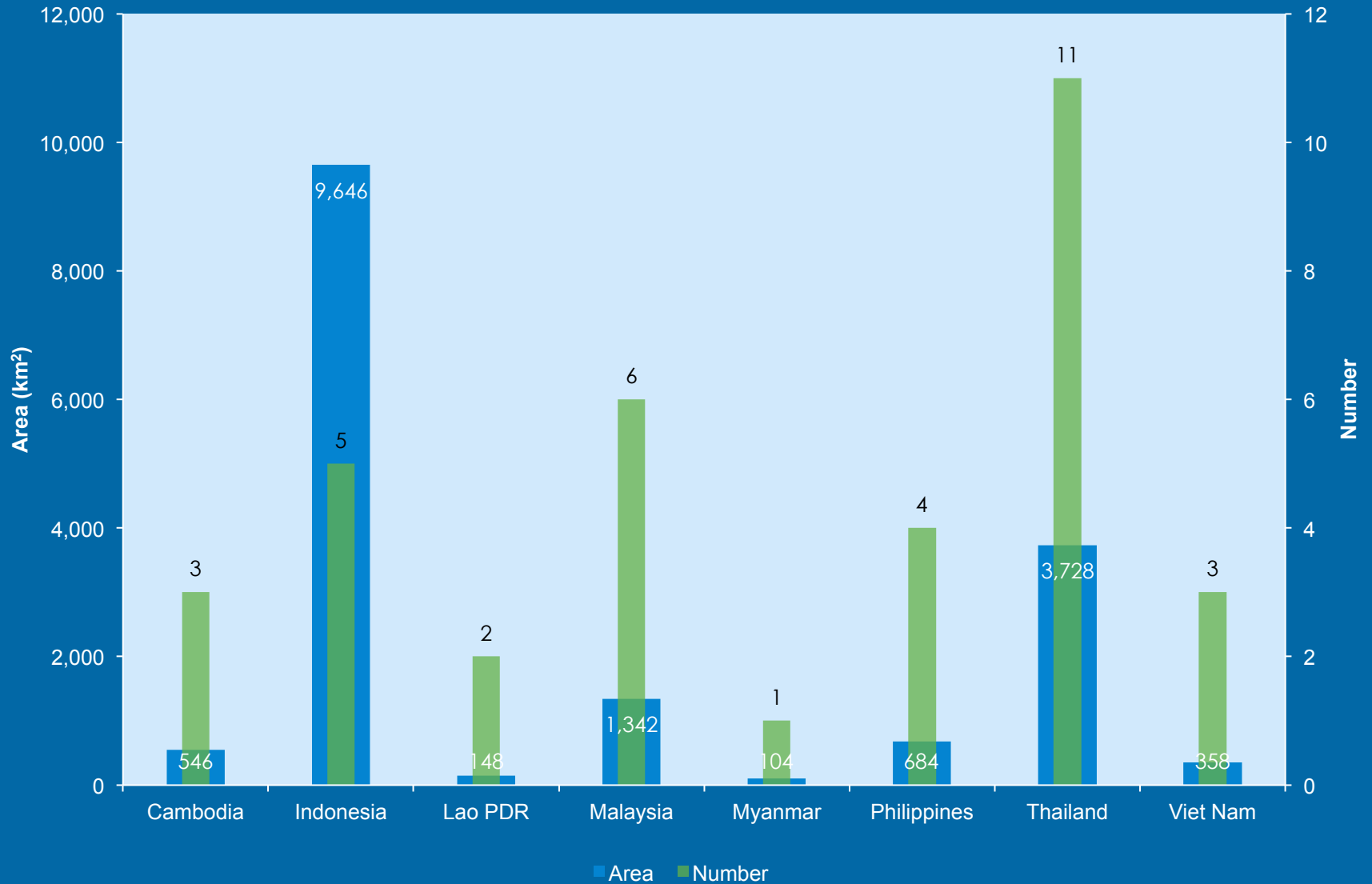
AT 1, 5, 11 Necessary forest conservation to meet Aichi Target of 17%
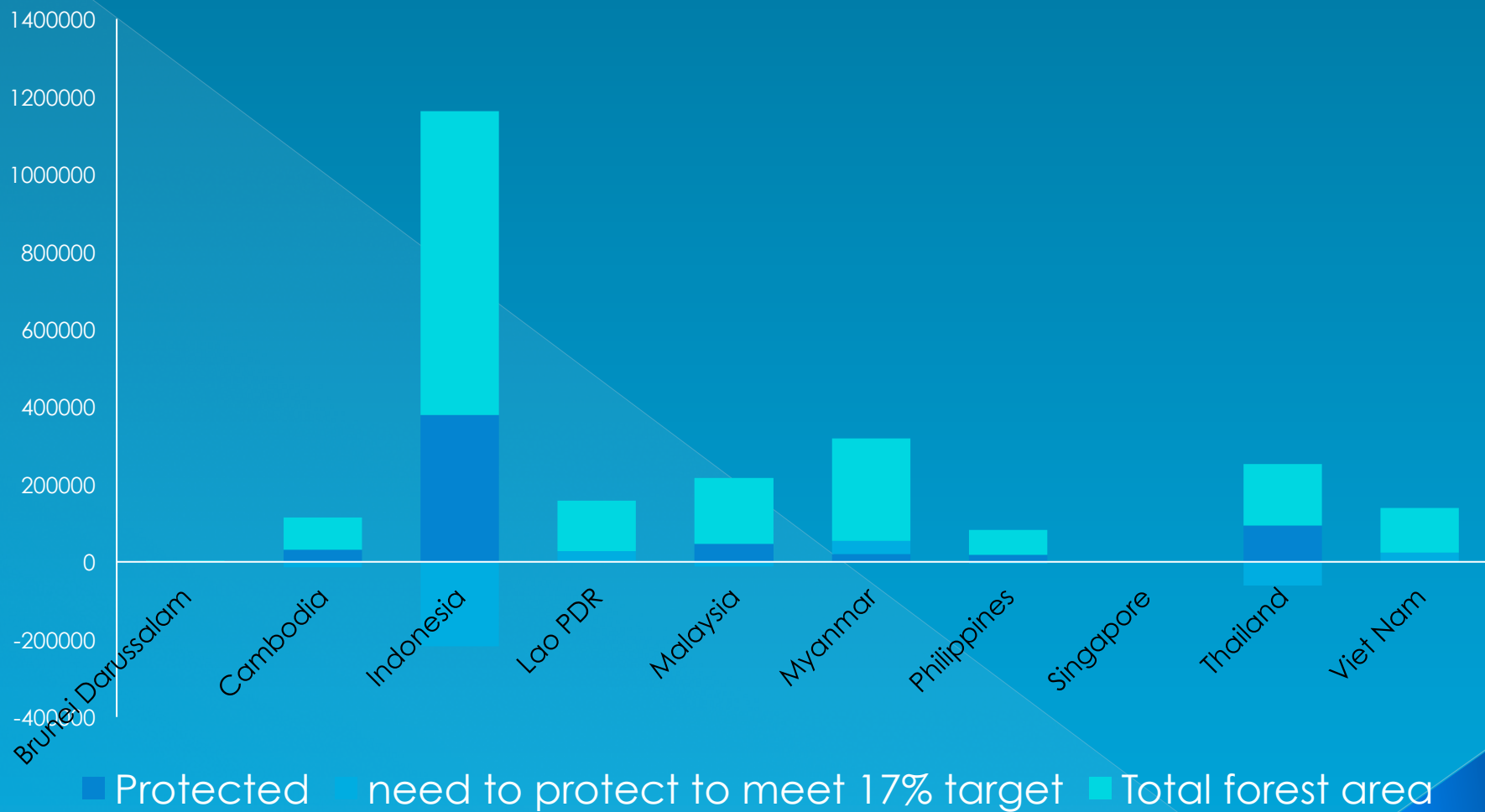
Protected – forests within protected area
Source of data: Forest Resources Assessment 2010

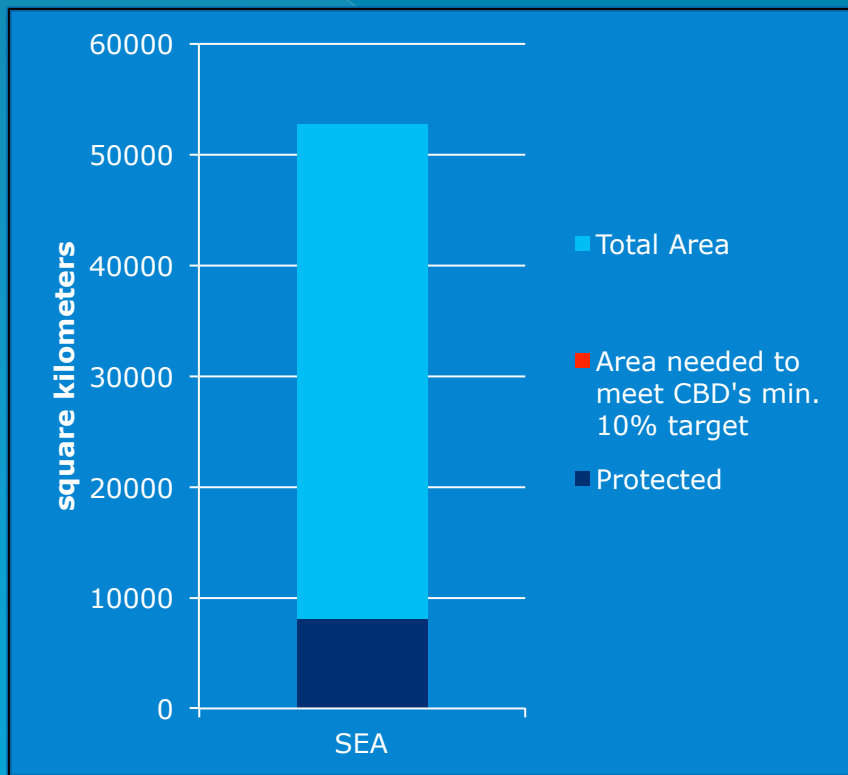# AT 1, 5,6,10,11. Necessary mangrove conservation to meet Aichi Target of 10%

Sources:
• 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 Baños, Philippines. 142 pp., 10 maps.
• FAO. 2007. The World's Mangroves 1980-2005. FAO Forestry Paper 153.
• Ministry of Natural Resources and Environment, Thailand. 2010. Marine Gap Analysis for Thailand.
• Marine Environment & Resources Foundation, Inc., Conservation International – Philippines and Borneo Marine Research Institute University Malaysia Sabah. 2009. Marine Protected Areas (MPA) Gap Analysis for Philippines and Malaysia.
• Ministry of Forestry, Indonesia. 2010. Establishment and Strengthening National and Regional Systems of Marine and Terrestrial Protected Areas: Protected Area System Gap Analyses at National Level.
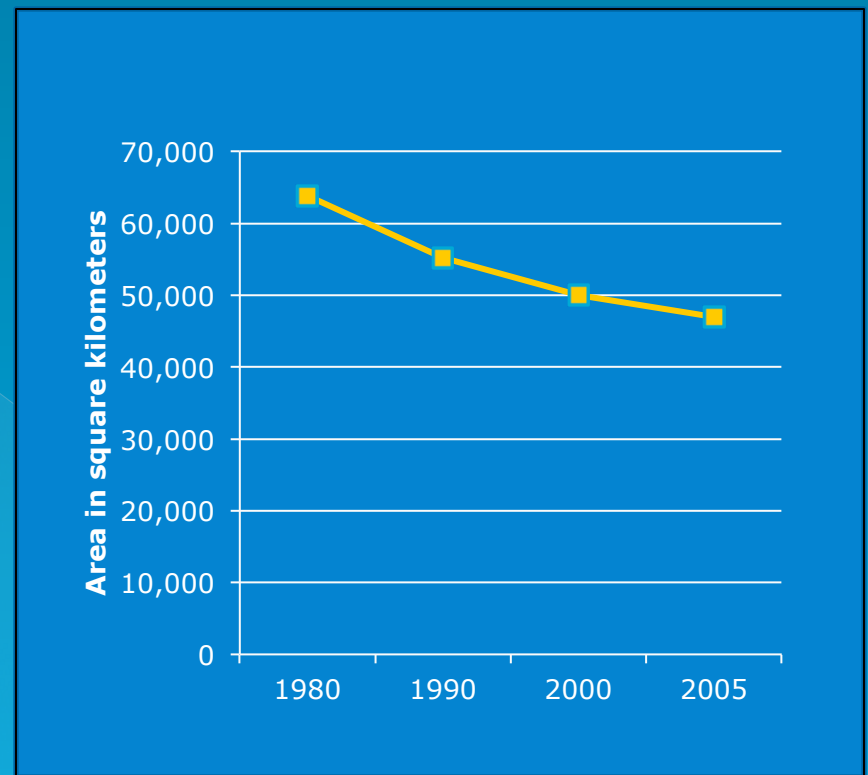
AT 1,5,6,10,11. Mangrove areas decrease despite meeting CBD 10% target
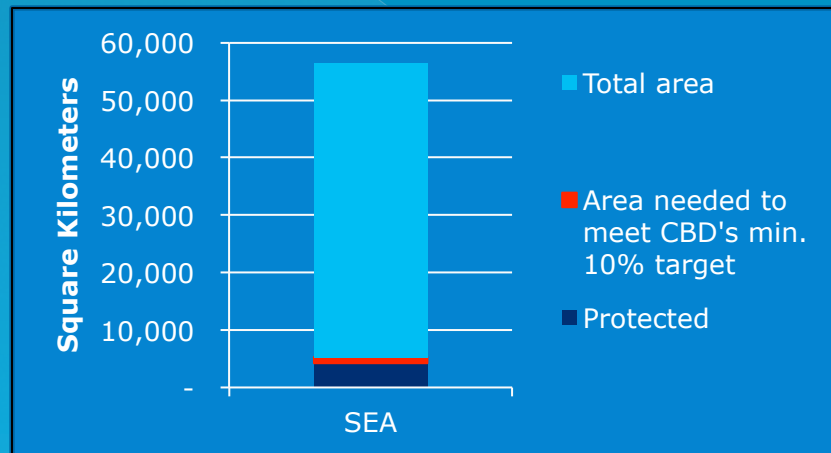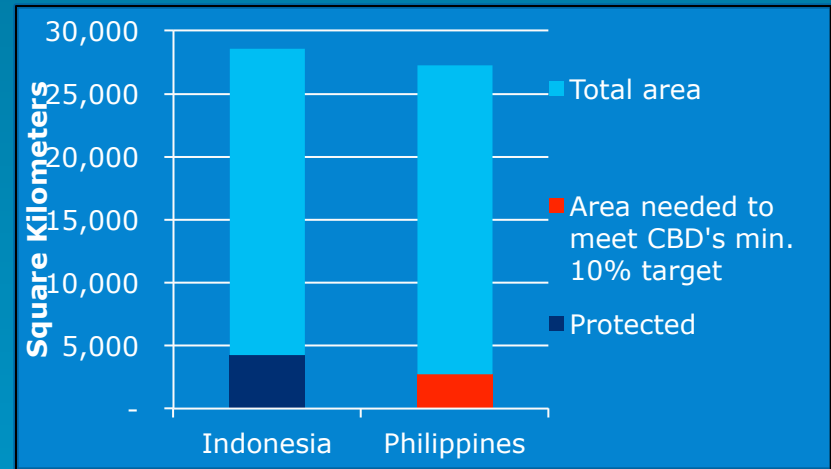
Conservation Status

Legend:
- Total Area
- Area needed to meet CBD's min. 10% target
- Protected

y-axis: square kilometers (0 – 60000)
x-axis: SEA

Trends in Mangrove Area
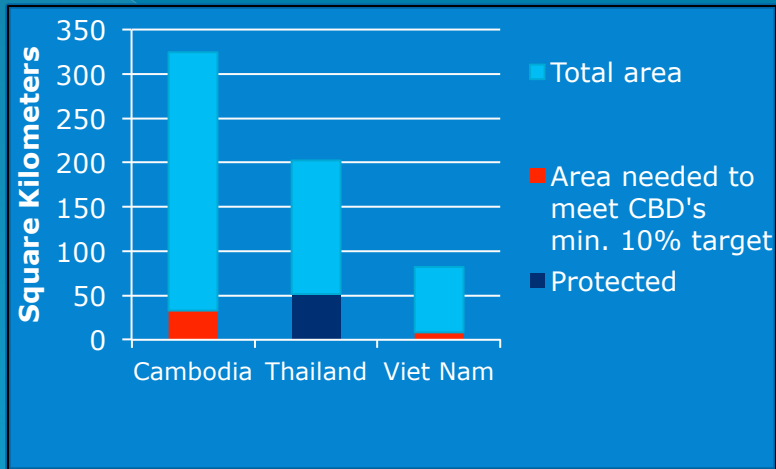

y-axis: Area in square kilometers (0 – 70,000)
x-axis: 1980, 1990, 2000, 2005

Sources:
• 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 Baños, Philippines. 142 pp., 10 maps.
• FAO. 2007. The World's Mangroves 1980-2005. FAO Forestry Paper 153.
• Ministry of Natural Resources and Environment, Thailand. 2010. Marine Gap Analysis for Thailand.
• Marine Environment & Resources Foundation, Inc., Conservation International – Philippines and Borneo Marine Research Institute University Malaysia Sabah. 2009. Marine Protected Areas (MPA) Gap Analysis for Philippines and Malaysia.
• Ministry of Forestry, Indonesia. 2010. Establishment and Strengthening National and Regional Systems of Marine and Terrestrial Protected Areas: Protected Area System Gap Analyses at National Level.
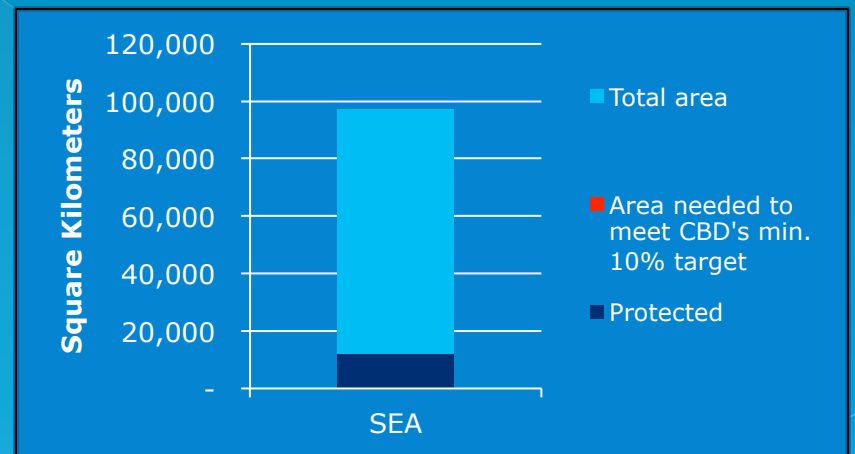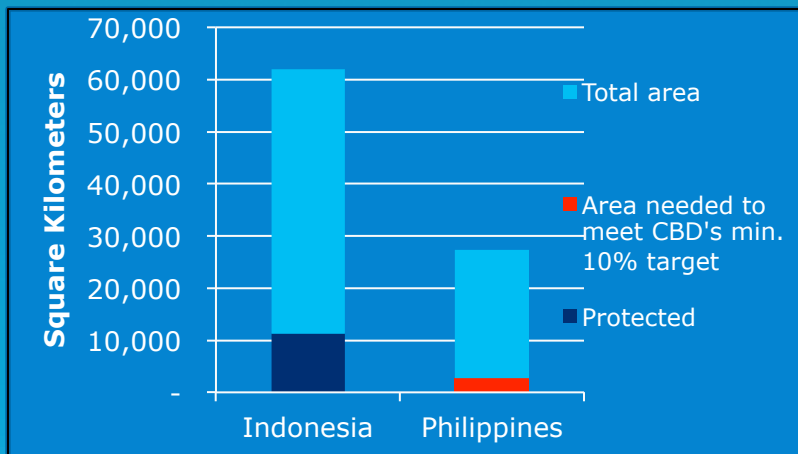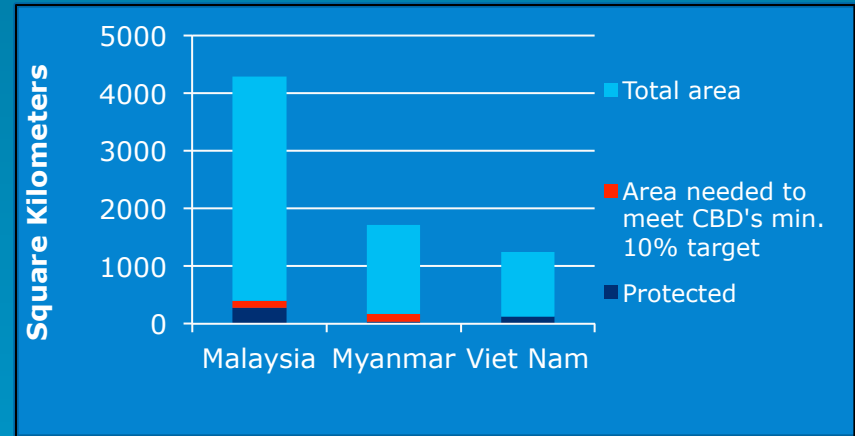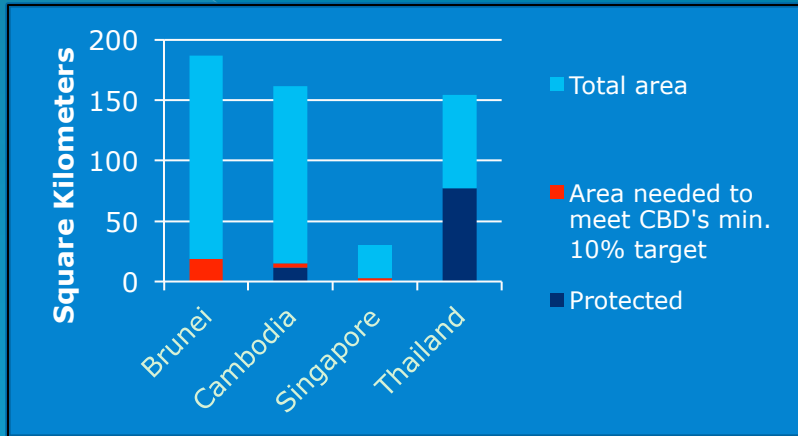
AT 1,5,6,10,11. Areas needed to meet 10% target for seagrasses

Sources:
◉ Ministry of Environment, Cambodia. 2009. Fourth National Report to the Convention on Biological Diversity. Kingdom of Cambodia. March 2009, pp15.
◉ Ministry of Environment Indonesia. 2009. Fourth National Report to the Convention on Biological Diversity, Government of Indonesia. pp.23-24.
◉ Department of Environment and Natural Resources Philippines. 2009. Assessing Progress Towards the 2010 Biodiversity Target, The Fourth National Report to the Convention on Biological Diversity, Republic of the Philippines, pp.52.
◉ Ministry of Natural Resources and Environment, Thailand. 2010. Marine Gap Analysis for Thailand. 2010.
◉ United Nations Environment Programme. 2008. National Report on Seagrass in South China Sea, Viet Nam. October 2008, pp.5, accessed on 10 April 2010 at http://www.seagrasswatch.org/Training/proceedings/Seagrass_Watch_Bali_workshop_May09.pdf.

# AT 1,5,6,10,11. Large scale coral conservation efforts in Thailand and Indonesia helped meet the 10% target
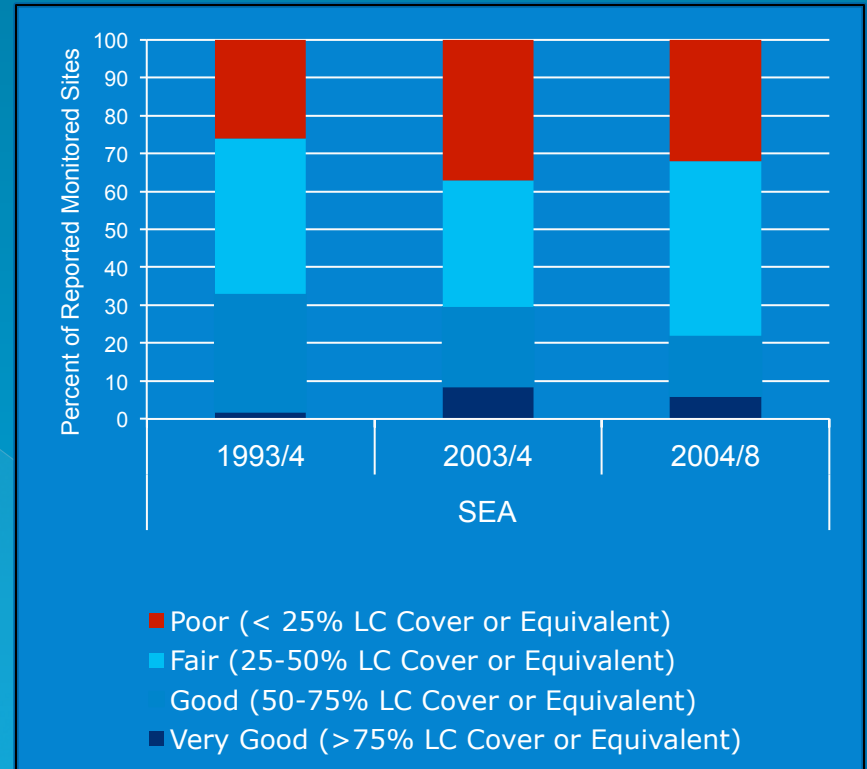
Sources:

◎ Wilkinson, C. 2008. *Status of coral reefs of the world: 2008*. Global Coral Reef Monitoring Network and Reef and Rainforest Research Centre, Townsville, Australia, pp296 accessed on 6 April 2010 at http://www.reefbase.org/download/gcrmn_download.aspx?type=10&docid=13312.

◎ Ministry of Natural Resources and Environment, Thailand. 2010. Marine Gap Analysis for Thailand.

◎ Department of Environment and Natural Resources, Philippines 2009. Assessing Progress Towards the 2010 Biodiversity Target: The 4th National Report to the Convention on Biological Diversity. pp45.

◎ National Parks Board, Singapore. 2010. Singapore – 4th National Report to the Convention on Biological Diversity.

◎ Chou, L. M. 2009. Status of Marine Protected Areas in the ASEAN Region. Powerpoint presentation to the Regional Technical Workshop on Gap Analyses for Marine and Terrestrial PAs, Yogyokarta, Indonesia. 2009.

◎ Ministry of Forestry, Indonesia. 2010. Establishment and Strengthening National and Regional Systems of Marine and Terrestrial Protected Areas: Protected Area System Gap Analyses at National Level.

AT 1,5,6,10,11. Corals are recovering but progress is slow

Conservation Status
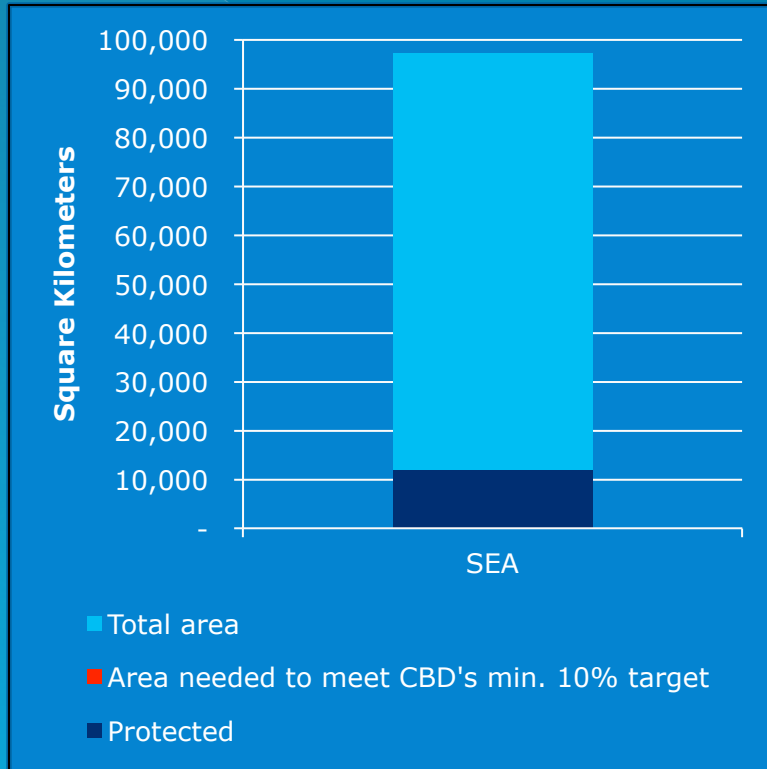

Live Coral Cover

Sources:
- Wilkinson, C. 2008. *Status of coral reefs of the world: 2008*. Global Coral Reef Monitoring Network and Reef and Rainforest Research Centre, Townsville, Australia, pp296 accessed on 6 April 2010 at http://www.reefbase.org/download/gcrmn_download.aspx?type=10&docid=13312.
- Ministry of Natural Resources and Environment, Thailand. 2010. Marine Gap Analysis for Thailand.
- Department of Environment and Natural Resources, Philippines 2009. Assessing Progress Towards the 2010 Biodiversity Target: The 4th National Report to the Convention on Biological Diversity. pp45.
- National Parks Board, Singapore. 2010. Singapore – 4th National Report to the Convention on Biological Diversity.
- Chou, L. M. 2009. Status of Marine Protected Areas in the ASEAN Region. Powerpoint presentation to the Regional Technical Workshop on Gap Analyses for Marine and Terrestrial PAs, Yogyokarta, Indonesia. 2009.
- Tun, Karenne, Chou Loke Ming, Thamasak Yeemin, Niphon Phongsuwan, Affendi Yang Amri, Niña Ho, Kim Sour, Nguyen Van Long, Cleto Nanola, David Lane, Yosephine Tuti, 2008. Status of Coral Reefs in Southeast Asia. Global Coral Reef Monitoring Network, accessed on 22 February 2010 at http://www.reefbase.org/download/gcrmn_download.aspx?type=10&docid=13321.
- Ministry of Forestry, Indonesia. 2010. Establishment and Strengthening National and Regional Systems of Marine and Terrestrial Protected Areas: Protected Area System Gap Analyses at National Level.

AT 1,5, 6,10,11. At the ASEAN Regional Level
There is a clear need to focus on seagrass conservation

Mangroves
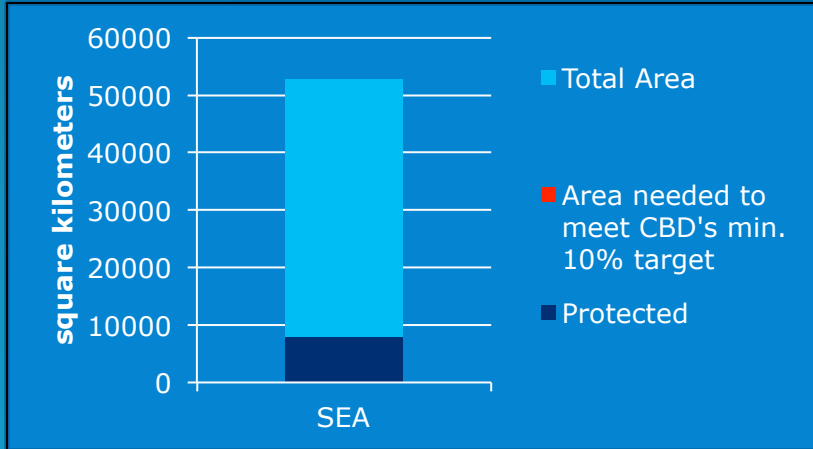
Seagrass
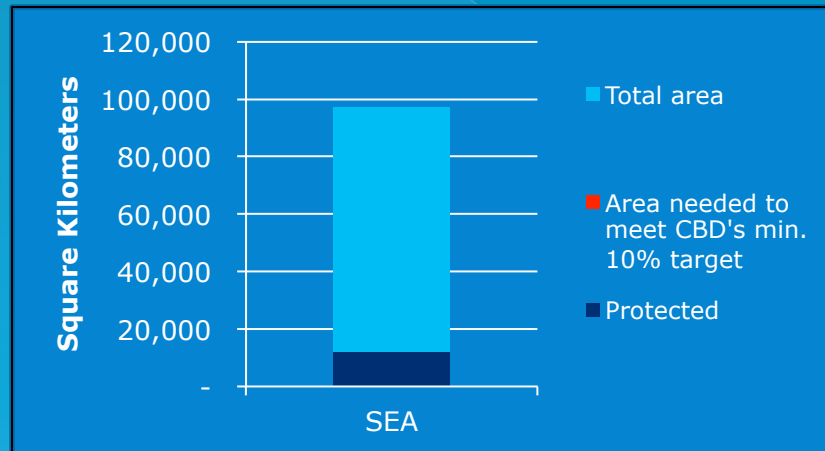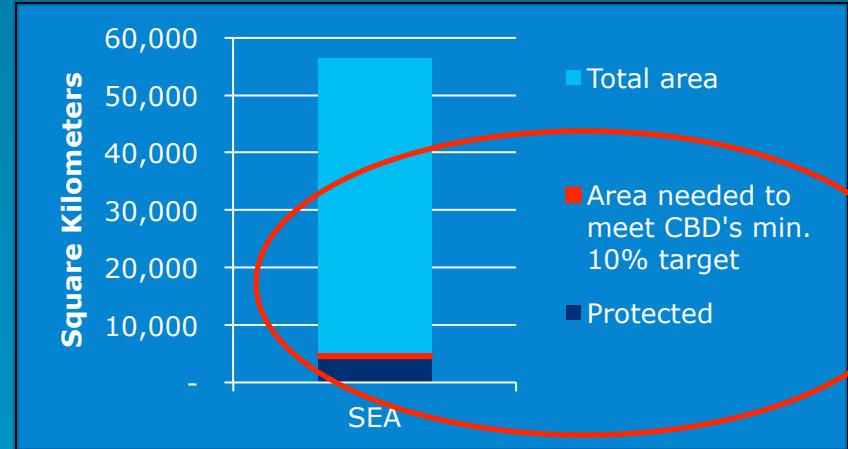
Coral Reefs

Sources:
◉ Ministry of Environment, Cambodia. 2009. Fourth National Report to the Convention on Biological Diversity. Kingdom of Cambodia. March 2009, pp15.
◉ Ministry of Environment Indonesia. 2009. Fourth National Report to the Convention on Biological Diversity, Government of Indonesia. pp.23-24.
◉ Department of Environment and Natural Resources Philippines. 2009. Assessing Progress Towards the 2010 Biodiversity Target, The Fourth National Report to the Convention on Biological Diversity, Republic of the Philippines, pp.52.
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◉ United Nations Environment Programme. 2008. National Report on Seagrass in South China Sea, Viet Nam. October 2008, pp.5, accessed on 10 April 2010 at http://www.seagrasswatch.org/Training/proceedings/Seagrass_Watch_Bali_workshop_May09.pdf.

Target	Observation Datasets	Monitoring	ACB Activities
12. Preven-ted extinction of threatened species.	Species occurrence	Extinction risk and changes in extinction risk	
	Populations	Changes in populations of threatened species (and other sensitive species, e.g., endemics)	

[1] *Critically endangered + Endangered + Vulnerable*
Source: IUCN Red List of Threatened Species v2010.1 www.iucnredlist.org

Comprehensive and globally interoperable species and protected area databases

Species Database
- Uses the Darwin Core (DwC) as a standard format for encoding species information.
- Designed to facilitate the exchange of information
- Developed by the Taxonomic Database Working Group (TDWG) of the Biodiversity Information Standards, it allows data owners to publish biodiversity information in an easily understood format
- Contains concepts ('fields', 'elements' or 'attributes') used to describe the most common information about a specimen.

Protected Areas Database
- Based on the concept of protected areas (PAs) as one of the key cornerstones of biodiversity conservation.
- Digitization of PA information in a common standard format using the United Nations Environment Programme-World Conservation Monitoring Centre (UNEP-WCMC)
- ACB developed online and offline PA database encoding interfaces to facilitate encoding of PA information in the region.

Threatened species[1] by environment

Taxa	Freshwater	Marine	Terrestrial
Fishes	149	82	-
Corals, Sea Anemones, Jellyfish	-	189	-
Amphibians	83	-	135
Molluscs	1	2	31
Mammals	15	9	266
Reptiles	41	5	68
Birds	30	3	194
Crustaceans	77	-	2
Insects	34	-	58
Plants	-	-	1202
All taxa	**430**	**290**	**1956**

[1] *Critically endangered + Endangered + Vulnerable*
Source: IUCN Red List of Threatened Species v2010.1 www.iucnredlist.org

Summary of threatened species by country

Species Group	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Vertebrates										
Fish	8	28	138	23	56	31	63	25	71	45
Mammals	35	37	185	45	70	45	39	12	57	54
Birds	16	23	114	21	42	40	67	14	45	37
Reptiles	5	12	27	11	21	22	35	4	22	27
Amphibians	3	3	32	5	47	0	48	0	4	16
Invertebrates										
Insects	1	0	40	0	5	1	28	2	5	1
Crustaceans	0	0	14	3	32	2	4	3	19	4
Molluscs	0	0	1	0	30	0	1	0	0	0
Coelenterates	0	1	3	0	3	0	1	2	2	1
Plants										
Trees and Shrubs	94	29	353	17	647	33	172	54	76	118
Other flowering plants	4	0	27	0	21	0	35	1	2	0
Mosses and liverworts	0	0	0	0	2	0	2	0	0	0
Conifers	1	0	6	3	15	4	5	0	2	13
Cycads	0	2	0	1	1	1	1	0	6	16
TOTAL THREATENED (CR+EN+VU)	**167**	**135**	**940**	**129**	**992**	**179**	**501**	**117**	**311**	**332**

GAPS in biodiversity information management in the ASEAN Region

- SPECIES information
- Committed network of DATA PROVIDERS
- Comprehensive list of PROTECTED AREAS OF EACH ASEAN COUNTRY
- Database of INVASIVE SPECIES IN THE ASEAN REGION
- Data needs and information relating to emerging paradigms such as PES, TEEB and ABS

URGENTLY Needed Products for Biodiversity Decision Making

- KEY BIODIVERSITY AREAS identified in 8 countries
- Identification of the Network of Marine Protected Areas
- DSS and KM products that use science-based information and cater to the information requirements of policy - makers

Thank You
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