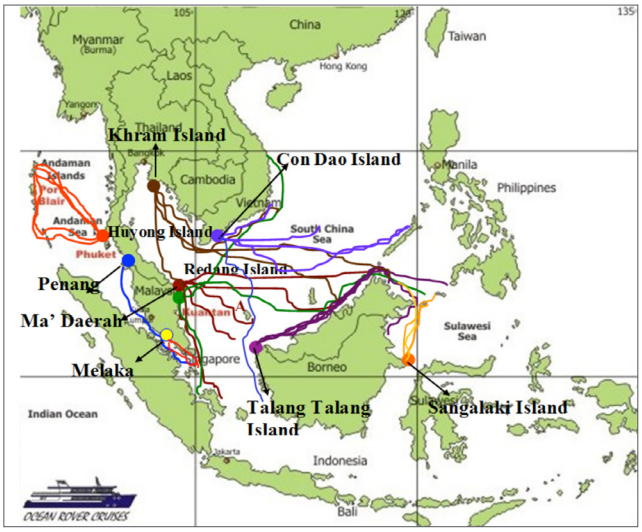

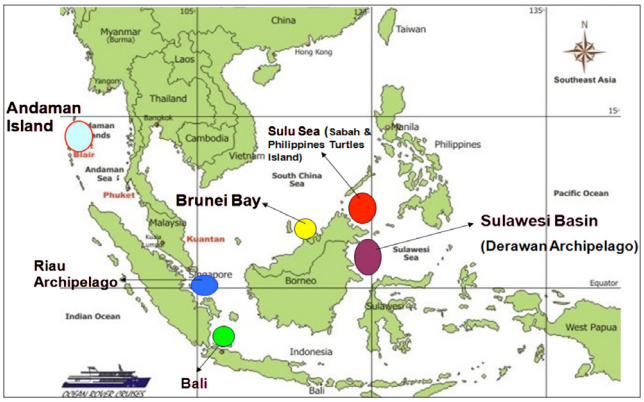

Figure 34. Migration routes of green turtles in the Southeast Asian waters determined through satellite telemetry studies (left) and location of 11 genetically distinct breeding stocks or management units of green sea turtles in Southeast Asia (above)

to genetic diversity.

Climate change which increases water temperatures also changes ocean currents that are critical to migrating turtles, especially for hatchlings that are mostly transported by Sargassum seaweeds traveling with the water currents. Warmer ocean temperatures are also likely to negatively impact on the food resources for sea turtles and virtually all marine species. Coral reefs, which comprise the important food source for sea turtles, are also in great danger from the impacts of climate change.

SEAFDEC Initiatives in Conservation and Management of Sea Turtles

SEAFDEC has played important role in the conservation and management of sea turtles in the Southeast Asian region (Mohd Isa *et al*., 2008). The first regional program on conservation of sea turtles in Southeast Asia was started during the First ASEAN Symposium - Workshop on Marine Turtle Conservation in Manila, Philippines in 1993. Thus, starting in 1996, SEAFDEC/MFRDMD and SEAFDEC Training Department (TD) in collaboration with the ASEAN Member Countries conducted a series of programs in addressing the need to conserve the region's sea turtles species. Starting in 1998, more R&D programs were also implemented with funding support from the Japanese Trust Fund as shown in **Appendix 1**. From the results of the studies, the number of sea turtles recorded in the Southeast Asian countries had been estimated (**Table 54**), of which the green turtles have been recorded with the most number of species.

Based on the results of research studies conducted by SEAFDEC/MFRDMD in the Southeast Asian region, the migratory routes of and the genetically distinct breeding stocks or management units of green turtles are shown in **Fig. 34** while the possible foraging habitats of sea turtles are mapped and shown in **Fig. 35**.

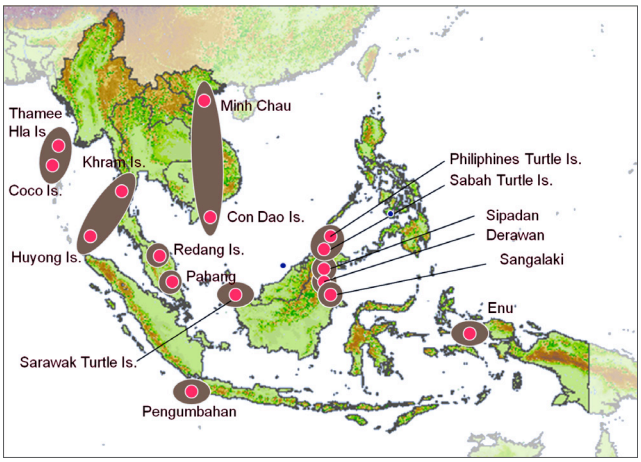

Figure 35. Possible foraging habitats of sea turtles in the Southeast Asian waters based on results of satellite telemetry studies

1.3.4 Sea Cucumbers

Sea cucumbers, especially those belonging to families Holothuriidae and Stichopodidae, form important parts of the multi-species invertebrate group, the products of which support international market demands. Based on the statistics of sea cucumber production of the Southeast Asian countries from 2000 to 2009, total production is highly fluctuating and ranges from about 4,000 to 29,700 MT annually. While the total marine capture fishery production of the region in 2009 was reported to be 14.1 million MT, about 0.033% of the total production was provided by sea cucumbers (**Table 55**). Indonesia and Philippines are the Southeast Asian countries that reported considerable amount of sea cucumber production, however, only the total production figures were reported without further classification to species level (SEAFDEC, 2009). Some countries such as Malaysia, Myanmar, Thailand, and Vietnam, are also known to have certain levels of sea cucumber production, but their reports do not reflect such production and are grouped instead under the "invertebrate group" or "miscellaneous marine aquatic group", probably because the volume of production is not

Table 55. Production of sea cucumbers in some Southeast Asian countries (MT)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Brunei Darussalam	...	...	...	...	...	...	...	3	0.90	0.12
Cambodia	...	...	...	3	...	...	...	...	...	...
Indonesia	4,690	3,517	9,116	3,014	6,930	7,178	29,733	4,273	3,623.00	3,750
Philippines	...	965	...	979	1,006	761		851	777.00	934

Sources: *Fishery Statistical Bulletin for the South China Sea Area (SEAFDEC, 2000-2009) and Fishery Statistical Bulletin of Southeast Asia (SEAFDEC 2010)*

Table 56. Destination countries and value (in US$) of sea cucumber products exported from Indonesia, Philippines and Thailand in 2007

Destination Country	Indonesia	Philippines	Thailand
Hong Kong	497,682	2,976,398	2,494,676
Singapore	256,367	642,446	548,122
Taiwan	30,000	10,132	1,627,500
Malaysia	274,872	73,450	-
USA	13,831	87,651	548,122
Vietnam	288,085	-	819,800
China	-	115,171	-
Japan	-	12,025	-
North Korea*	-	-	561,439
South Korea	-	1,015,263	-

Source: *Fishery Statistical Bulletin of Southeast Asia (SEAFDEC, 2011)*

much and collection of sea cucumber is by nature scattered making data collection for statistical purposes difficult to undertake.

As a result therefore, sea cucumbers contributed very small quantity to the total marine capture fishery production of the region. While there could be weaknesses in data collection of sea cucumber production in most of the countries, the situation makes the understanding of the production status and trends of the species difficult to reckon with, particularly from official statistics figures collected by the countries. Other sources of information including research results and data collected through *ad hoc* schemes should therefore be gathered and incorporated in the over-all production in order to obtain a better picture of the status and trends of sea cucumber production from the Southeast Asian region.

In an attempt to address such concern, SEAFDEC in collaboration with eight Southeast Asian countries, namely: Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Vietnam conducted the Regional Study on Sea Cucumber Fisheries, Utilization and Trade in Southeast Asia in 2007-2008 by collecting secondary data and information available in the respective countries. Results of the study showed that there are approximately 135 species of sea cucumbers found in the region (SEAFDEC, 2009).

Moreover, sea cucumbers are generally harvested by local fishers using simple or traditional methods that vary and range from picking by hand during low tide, snorkeling at the depth of up to 10 meters, punching by a metal spear as well as using trawl nets (Labe *et. al*., 2007). The species are mostly utilized for local consumption while some are exported to Hong Kong markets where fishers are able to obtain high market prices (**Table 56**).

The Regional Study also recognized that there is very limited information on sea cucumbers in terms of statistical records, inadequate information on research works, and insufficient and/or limited biological data and knowledge on species identification. Despite these constraints, consideration is being given to this species group by the Southeast Asian countries especially in view of the declining and diminishing sea cucumber resources, and the emerging global concerns that focused on the conservation and management of sea cucumbers. In fact, such concerns had become one of the most popular issues being discussed in the international community, particularly at the CoP-CITES and several fora of FAO, and it has been anticipated that the listing of sea cucumber species in CITES Appendices could be brought up for discussion during the forthcoming CoP16-CITES in 2013. Therefore, it has become necessary for the Southeast Asian countries to take a serious look into the issues and collect relevant scientific/technical information on economically important sea cucumber species, *e.g.* production, utilization, trade, as well as the conservation and management measures that have been put in place, in order to come up with a common position of the Southeast Asian countries demonstrating that sea cucumber fisheries of the region are being undertaken in sustainable and responsible manner (Labe *et al*., 2007).

1.3.5 Seahorses

Seahorses comprise the genus *Hippocampus* of family Syngnathidae, consisting of 35 genera of pipefishes, pipehorses and seadragons, and falling within the order Gasterosteiformes (Vincent, 1996). Currently, 47 seahorse species have been identified in the world (Lourie *et al*., 1999 and 2004; CITES Species Database, 2011) although species identification still remains challenging with some of the taxonomy unresolved (Koldewey and Martin-Smith,