

Sustainable Management of Aquatic Species of International Concern: SEAFDEC Initiative

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Sustainable utilization and environmental conservation of aquatic resources are currently some of the general concerns of the international community as well as for the countries in the Southeast Asian region. SEAFDEC has been monitoring the progress and actions of the SEAFDEC Member Countries on the sustainable management of aquatic species especially those of international concern as well as those proposed to be listed under the appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Internationally, wildlife trade including the trade of aquatic species is regulated through the CITES of which all Southeast Asian countries are signatories to it.

The international concern for global aquatic biodiversity started in the 80s when the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Environment Program (UNEP) convened an Expert Consultation on Conservation of the Genetic Resources of Fish. Although the focus of the Expert Consultation was on fish genetics, their conclusions and recommendations were not different from what the international biodiversity community is now currently seeing. Moreover, various factors were identified during the Consultation as major threats to aquatic biodiversity. These include: (1) Habitat destruction and degradation; (2) Over-exploitation (*e.g.* extraction, hunting, fishing); (3) Pollution; (4) Aquatic Diseases; (5) Invasion of alien species (*e.g.* exotic fishes, planktons, pathogens); and (6) Global climate change (*e.g.* changes in migratory species, coral bleaching). Threats in marine and freshwater systems may have been inadequately understood but it appears that overexploitation is presently the greatest threat to marine species, followed by habitat loss. Meanwhile, the introduction of alien species, land-based pollution, as well as habitat loss and alteration of waterways through damming and water diversion all contribute to the declining levels of aquatic biodiversity in freshwater environments, but habitat loss continue to be the most severe threat to freshwater species followed by pollution and introduction of alien species.



Photo by Sid Tendencia of AQD (2011)

Common Positions of the ASEAN-SEAFDEC Countries on Fisheries Management and Trade

The ASEAN Member Countries came up with generic common positions for the management of fisheries. Specifically, the ASEAN countries emphasized that management of commercial fisheries including shark fisheries should be considered under the purview of FAO Code of Conduct for Responsible Fisheries (CCRF) and not under CITES. The common positions were discussed through the ASEAN mechanisms and were subsequently endorsed by the ASEAN authorities. Such general common positions are summarized in **Box 1**. The common positions were again discussed during the ASEAN-SEAFDEC Regional Technical Consultation on Fish Trade and Environment from 14 to 16 October 2002 in Bangkok, Thailand, where SEAFDEC Member Countries agreed to support the common positions endorsed by the ASEAN.

Aquatic Species of International Concerns

Recently, various aquatic species have been considered under international concerns as discussed through consultations and covered by a number of international treaties concerning the conservation and management of aquatic biodiversity (**Box 2**). The aquatic species that had been considered as main international concerns include the sea turtles, sharks, sea cucumbers, cetaceans, sea horses, corals, and humphead wrasse.

Sea turtles

The Southeast Asian region is home to six of the seven sea turtle species recognized worldwide. Among them are the leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), olive ridley (*Lepidochelys olivacea*), loggerhead (*Caretta caretta*), and flatback (*Natator depressus*). All six species are nesting across the Southeast Asian waters, with the exception of flatback, which is mostly reported in Indonesian waters.

Records have shown that the sea turtle populations declined over the last 20 years across much of Southeast Asia and the Pacific. For example, nesting populations of the Eastern Pacific leatherback turtles have dropped by 90% in the last 20 years. Today, it has been estimated that as few as 2300 adult nesting leatherback females are found across the entire

Box 1. Common positions of the ASEAN countries on fisheries management endorsed in 2002

- a. Proposals for listing in the CITES Appendices should be based on the principle of sustainable use of the resources in relation to any species
- b. Proposals should be backed by scientific-based data to be provided by competent scientific authorities
- c. Other than CITES, there are other competent authorities (e.g. FAO, ITTO) tasked to sustainably manage the species concerned should be encouraged to address any prevailing issues
- d. ASEAN as a group should proactively promote the management of marine and other aquatic species
- e. ASEAN countries should also try to support other countries on relevant CITES issues even if such issues are not of direct interest to the ASEAN region

Box 2. International treaties concerned with the conservation and management of aquatic biodiversity

1. RAMSAR Convention on Wetlands (1971)
2. United Nations Convention for the Law of the Sea (UNCLOS, 1982)
3. Convention on Biological Diversity (CBD, 1992)
4. Chapter 17 of Agenda 21 (1992)
5. GEF/UNDP/IMO Global Ballast Water Management Program (GloBallast)
6. UNEP Global Plan of Action for the Protection of the Environment from Land-Based Activities (GPA, 1995)
7. Cancun Declaration on Responsible Fishing (1992)
8. FAO Code of Conduct for Responsible Fisheries (1995)
9. UN Agreement on Straddling and Highly Migratory Fish Stocks (1995)
10. Kyoto Declaration (1995)
11. World Summit on Sustainable Development (Johannesburg, 2002)
12. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) - (1st July 1975)

Pacific Ocean. In 1970, close to 2000 nesting leatherback females were tagged in Terengganu, Malaysia, but only nine returned to nest in 1999 and only one or two per year thereafter (Liz *et al.*, 2005).

Hundreds of green turtles and hawksbill turtles have been illegally captured and killed for illegal trading. Moreover, turtle eggs are widely collected and eaten throughout Southeast Asia with serious consequences to the turtle populations. Another serious threat is the rampant trading of turtle shells and stuffed whole turtles. Almost 30,000 items made from the critically endangered hawksbill turtles were found on sale in Vietnam in 2002 (TRAFFIC Southeast Asia Indochina, 2004), signalling the death of thousands of these marine creatures.

As early as 1988, the Department of Fisheries Malaysia (DOFM) started its program on the conservation of sea turtles which included seven activities (Zulkifli *et al.*, 2004), namely: (1) tagging of sea turtles in Terengganu and Pahang; (2) nursing experiments of leatherback turtles; (3) studies on the ecology of the painted terrapin (saw-jawed

turtle, *Batagur borneoensis*) in Kuala Setiu, Terengganu; (4) studies on the incubation of sea turtle eggs in shaded and elevated hatcheries; (5) turtle beach surveys in Pahang, Terengganu, Malacca, and Perak; (6) monitoring of sea turtle hatchery operations; and (7) monitoring of sea turtle nesting populations.

Upon the establishment of the SEAFDEC Marine Fishery Resources Development and Management Department (MFRDMD) in Terengganu, Malaysia in 1992, the Department had been tasked to carry out the program on Marine Conservation and Stock Enhancement of Sea Turtles. Thus, with the collaboration of the SEAFDEC Member Countries, the Program was pursued starting in 1998 with financial support from the Japanese Trust Fund in SEAFDEC (SEAFDEC, 2008) with the objectives of compiling information on the status of research, conservation and management of sea turtles in Southeast Asia; establishing a mechanism for regional collaboration in the research and conservation of sea turtles; and undertaking studies on incidental catch of sea turtles in the region by various fishing gear. In addition, stock enhancement of sea turtles has also been carried out which includes stock identification, multiple paternities detection, tagging and satellite telemetry, head starting technique to enhance survival of hatchlings, cloning, and interaction between sea turtles and fisheries (Mahyam *et al.*, 2008). Moreover, the SEAFDEC Training Department (TD) also carried out activities aimed at reducing the interactions and mortality of sea turtles from fishing (Bundit, 2008; Isara *et al.*, 2009). TD also promoted the use of C-hook in hook-and-line fishing in the SEAFDEC Member Countries to minimize the by-catch of sea turtles (SEAFDEC, 2011).

Sharks

In Southeast Asia, the issue on conservation and management of sharks has been given high priority due to the rising number of proposals that have been raised for the possible listing of several commercially-exploited species of sharks in the CITES Appendices. The shark biodiversity of the region covers the tropical waters of South China Sea and adjacent waters, considered as among the richest in the world with at least 136 species of sharks. However, little is known about the biology and ecology of most shark species.

Indonesia is the world's leading nation in terms of elasmobranch species landings followed by Thailand,



Research on sea turtle foraging population by genetic study (SEAFDEC, 2011)



Small shark, *Hemigaleus microstoma*

Malaysia, and the Philippines (Chen, 1996). Sharks are commercially in demand for their fins, cartilage, skin, meat, oil, and liver. Nevertheless, since the meat of most sharks species is not of high economic value, carcasses are often discarded in the sea to save space on deep sea fishing boats. Records have shown that shark fin products exported from Malaysia amounted to about 10 metric tons in 2001, while Indonesia and Singapore exported dried shark fins in the combined total of 76.85 mt in 1989, 103.33 mt in 1991, 198.28 mt in 1992, and 331.68 mt in 1993.

In response to the possible listing of shark species in the Appendices of CITES, SEAFDEC convened a number of regional meetings where it was agreed that SEAFDEC should carry out Data Collection on Status and Trends of Shark Fishery and Utilization in the Southeast Asian Countries (SEAFDEC, 2008). Moreover, with assistance from SEAFDEC, the Member Countries were encouraged to develop their respective National Plans of Action on Sharks (NPOA-Sharks) to be supported with scientific evidence in accordance with the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). In 2006, Malaysia developed its NPOA-Shark based on the guidelines set out in the IPOA-Sharks, to ensure the conservation and management of shark and their long-term sustainable use (DOFM, 2006).

Sea cucumbers

Sea cucumber also known as sandfish, is one of the most important commercially-exploited aquatic species in Southeast Asia. Although the status of its fisheries remains unknown, sea cucumber has been reported to be heavily exploited in China, Indonesia, Malaysia, Philippines, Thailand and Vietnam (Bruckner, 2005).

Efforts have therefore been made to improve the conservation and management of sea cucumbers in the region. Reports have indicated that Indonesia has the



Sandfish juveniles on sandy-muddy substrate (SEAFDEC, 2011)



Some of the sea cucumber species being studied in the Philippines (Photo: NFRDI (2007))

world's largest sea cucumber fishery, where there are regulations on trawling for sea cucumbers and maximum densities for cage culture of juveniles collected from the wild. In some locations, various voluntary community-based conservation measures had been carried out (Bruckner, 2004). In Malaysia, sea cucumbers exploitation had been dominant in Pulau Langkawi, Pulau Pangkor, Perak and in Sabah. On the other hand, Philippines is the second largest producer of sea cucumbers in the world, and sea cucumber fishery in the country is a year round activity with a peak season from March to June.

In Thailand, sea cucumbers are harvested for local consumption and export with *Holothuria scabra* and *H. atra* being the most popular, although overexploitation and shift to less valuable species have been reported. Considering that concerns had been raised at the various sessions of CITES to include the commercial sea cucumber species in the CITES Appendices, which could have negative impacts on sea cucumber fisheries in the region, SEAFDEC conducted a regional study on sea cucumber fisheries, trade and utilization in Southeast Asia in 2008. Moreover, the *ad hoc* Regional Working Group on Sea Cucumber Fisheries was established to support the planning and conduct of the said study (SEAFDEC, 2008b).

Cetaceans

Cetaceans are among the important aquatic species of international concerns, and issues on conservation and management have been raised at various fora particularly the CITES and International Whaling Commission (IWC). However, small cetaceans (*i.e.* small whales, dolphins, and porpoises) have become popular attractions in the animal display industry with the rise of marine aquaria. Since 1960s, reports indicated that Indonesia supplied its own three dolphinaria by occasionally importing mostly



Top: Bryde's whale (Bangsaen, Thailand, 2008);
 Middle: false killer whale (Phuket, Thailand, 2008);
 Bottom: long-beaked common dolphin (South China Sea, 2008)
 Source: SEAFDEC (2009a)

the bottlenose dolphins (Perrin, 2002) while Singapore imported six Indo-Pacific hump-backed dolphins from Thailand in 1999 (Sue and Randall, 2005).

In this connection, TD had initiated the collection of information on cetacean species in both marine and freshwater ecosystems in Southeast Asia since 2008, and reviewed the issues related to existing whales and dolphins, and habitats of cetaceans in the Southeast Asian countries, as well as the declining Irrawaddy dolphins in the Mekong River (SEAFDEC, 2009; SEAFDEC, 2009a). Meanwhile, efforts had been made in Myanmar to preserve the “cooperative fishing” between fishers and the Irrawaddy dolphins in the Ayeyarwady River, which the country considered as a fishery cultural heritage (Mya, 2007).

Sea horses

All sea horses (Syngnathidae) belong to one genus *Hippocampus*, which comprise about 33 species of the sea horses worldwide (Lourie, 2004). Sea horses are threatened by direct exploitation, accidental capture in non-selective fishing gear (as by-catch) and degradation of their habitats. By-catch from trawlers appears to be the largest source of sea horses in international trade, while the trawls also damage their coastal habitats. More research needs to be done to assess the loss of sea horse habitat, especially the sea grass beds, and its impact on the wild populations.

A total of 15.95 million sea horses had been traded annually with 15.83 million comprising wild-caught individuals and 0.12 million from breeding farms. At least 19 species had been traded with the most commonly traded species

being the *Hippocampus kuda*, *H. trimaculatus* and *H. spinosissimus*. Thailand and Vietnam export the largest volumes of sea horses with Thailand's export reported to account for over 90% of the sea horse traded (Vincent, 2010). A single shipment of dried seahorses in Poland, comprising of an estimated 1–2 million specimens, was reported to have originated from Indonesia although Indonesia reports low levels of export in sea horses.

In an effort to address the threatened extinction of the sea horses, SEAFDEC through its Aquaculture Department (AQD) continued refining the seed production techniques to improve production of hatchery-bred juveniles (SEAFDEC, 2009a). Although the culture of sea horses could be an option to address the declining population, conservation is of utmost priority to revive the wild populations. Vincent and Koldewey (2005) pointed out that such conservation efforts should include reduction of fishing efforts and responsible conduct of sea horse aquaculture to ensure that the wild populations are kept intact.

Corals

Southeast Asia has the highest coral diversity in the world, with Indonesia, Malaysia and the Philippines along with Papua New Guinea forming the Coral Triangle which is the center of global coral diversity. The region has 100,000 km² of coral reefs (34% of the world's total), which are home to over 600 of the 800 reef building coral species of the world (Tun *et al.*, 2004; Burke *et al.*, 2002).

However, 38% of the coral reefs in Southeast Asia had been destroyed, while another 28% are critically threatened and 29% are threatened, with only 5% which are at low risk from human activities (Tun *et al.*, 2004). Imports of corals are difficult to monitor accurately, and as noted by Bruckner (2001) tracking trade using the CITES Trade Database provides limited information, because corals are reported up to genus only, and the volume is reported by item or weight. The CITES mechanism, however, could promote the development of strategies to protect corals. While certain Southeast Asian countries have developed management plans for the sustainable harvest of corals, this mainly targets the CITES-listed species.

Humphead or Napoleon wrasse

Humphead or Napoleon wrasse, *Cheilinus undulatus* is a distinctive coral reef fish which can grow to over two meters in length, and found broadly in the Indo-Pacific waters from East Africa to French Polynesia, Australia to India. This species is currently listed under the CITES Appendix II and classified as endangered under the IUCN Red List. Sabah is the major supplier and source of humphead wrasse in Malaysia, where an extensive visual census survey showed that only two out of 30 survey

sites have more than one fish per square km and only two reproductive sites were identified. Population of humphead wrasse in Sabah was reported to have declined since 1974. This species is found mainly in the marine protected area (MPA) of Peninsular Malaysia (e.g. Pulau Payar in the west coast) and in Mabul Island, Bodgaya Island (Semporna District) and Sipadan Island in Sabah in the east coast (Canbanban, pers. comm.; Allen, WWF unpublished data). Nevertheless, the humphead wrasse is nowadays rarely seen by divers in much of eastern Malaysia where most of the country's coral reefs are located, except at Pulau Layang Layang, west of Sabah and Pulau Sipadan (TRACC, 2004). In the Philippines, the humphead wrasse is only found in Palawan which appears to be the stronghold for this species in the country, but where the species has also been extracted in numbers. In many areas around Indonesia, the humphead wrasse is now rarely seen especially in diving spots which once served as habitats for the species. However, juveniles could be observed again once the live reef fishery operation is stopped (Erdmann, pers. comm.) and the illegal, unregulated and unreported (IUU) fishing and trading of humphead wrasse, *Cheilinus undulatus* is controlled. Reports have indicated that in the Philippines, Indonesia and probably in Sabah of east Malaysia, illegal harvesting of the humphead wrasse with cyanide still occurs. In fact, in the Kei Islands of Indonesia, one out of the two ships involved in the export of humphead wrasse did not have the appropriate permits. At any rate, the export of humphead wrasse from Southeast Asia declined by 22% over the one year period from 1995-1996.

Adults are uncommon in most fished areas and 80-90% of individuals now in trade are large juveniles. Despite the introduction of management measures in a number of countries, illegal, unreported and unregulated harvest for international trade continues and the species has recently been reclassified by IUCN from Vulnerable to Endangered. Although the species does not form a significant economic component of the trade, the high retail value of the humphead wrasse (sometimes exceeding US\$ 130/kg) is a considerable incentive to continue fishing even if it has become harder to catch the decreasing stock of the species.

Conservation of Aquatic Species under International Concerns: SEAFDEC Initiatives

Since 1999, SEAFDEC has been paving the way for the ASEAN-SEAFDEC Member Countries to discuss international issues related to fish and fish products. Through the series of Consultations, SEAFDEC was able to provide the fishery authorities of the ASEAN countries with necessary information on trade-related issues and environment-related tasks on the conservation

of species of international concern such as the issues under UN General Assembly, WTO, FAO and CITES as well as the requirements of importing groups such as the EU. SEAFDEC analyzed the outcomes of the regional discussions in order to come up with future regional action plans to help the countries in generating common/coordinated positions that would safeguard the interests of the countries at international fora.

Meetings and consultations

In monitoring the emerging international fish trade-related issues and environment related tasks, and in implementing projects on responsible fisheries as well as on conservation and management of aquatic species of international concerns, SEAFDEC provides the Member Countries with appropriate channel to reflect the respective country's efforts in managing fisheries. SEAFDEC also assists the Member Countries in developing regional common/coordinated positions, as well as push forward the views from the fishery agencies in the region into those of the international instruments. For this purpose, SEAFDEC convened a series of meetings and consultations, some of which are listed in **Box 3**.

Research activities

With the collaboration of the Member Countries, SEAFDEC continues to undertake several initiatives (**Box 4**), which include the conservation and management of sharks and marine turtles; and seed production of species under international concerns, e.g. sea horses, humphead wrasse, abalone, giant clam, sea cucumbers, angel-wing clam, among others for stock enhancement purposes.

In the conservation and management of sharks, SEAFDEC collaborated with Member Countries for the regional study on Shark Production, Utilization and Management in the Region, the outcome of which was published and disseminated to concerned people and organizations/institutions. Some Member Countries have already established their National Plans of Action on Conservation and Management of Sharks (DOFM, 2006). On sea turtles, initiatives have been undertaken by SEAFDEC on the introduction of selective fishing gear to minimize turtle by-catch, e.g. TEDs for purse seine and J-Hook/Circle Hook for long-line fisheries, as well as modified the drifting fish aggregating devices to mitigate sea turtle mortality from fishing.

Way Forward

It is obvious that regional data and information on aquatic species of international concerns are still insufficient therefore efforts must be intensified to collect data and information on the status, utilization and trade of such

Box 3. Initiatives of SEAFDEC on the conservation of aquatic species of international concerns

1. SEAFDEC Preparatory Meeting on Issues of International Fish Trade and Environment (November 1999)
2. ASEAN-SEAFDEC Regional Technical Consultation on Fish Trade in ASEAN Region (April 2001)
3. Meeting of ASEAN Expert Group on CITES (AEG-CITES) (August 2002)
4. ASEAN-SEAFDEC Regional Meeting on Fish Trade and Environment (October 2002)
5. ASEAN-SEAFDEC Regional Technical Consultation on Fish Trade and Environment (March 2004)
6. ASEAN-SEAFDEC Regional Technical Consultation on Fish Trade and Environment (February 2005)
7. ASEAN-SEAFDEC Preparatory Meeting on Environmental Related Tasks in Southeast Asia: Sharks & Sea Cucumbers (October 2005)
8. ASEAN-SEAFDEC Regional Technical Consultation on International Fisheries-related Issues (September 2006)
9. ASEAN-SEAFDEC Preparatory Meeting on Environmental Related Tasks in Southeast Asia: Sharks & Sea Cucumbers (October 2006)
10. ASEAN-SEAFDEC Regional Technical Consultation on International Fisheries-related Issues (February 2007)
11. ASEAN-SEAFDEC Regional Technical Consultation on International Fisheries-related Issues (February 2008)
12. ASEAN - SEAFDEC 1st Regional Workshop on Information Gathering and Cetacean Research in the Southeast Asian Waters (July 2009)
13. ASEAN-SEAFDEC Regional Technical Consultation on International Fisheries-related Issues (February 2010)
14. ASEAN-SEAFDEC Regional Technical Consultation on International Fisheries-related Issues (January 2011)

Box 4. Research activities of SEAFDEC on the conservation of aquatic species of international concerns

1. Regional Study on Sharks Production, Utilization and Management in the ASEAN Region by TD
2. R&D on Stock Enhancement for Threatened Species of International Concern by AQD, Iloilo, Philippines
3. Breeding and artificial seed production technologies of humphead wrasse by AQD
4. Breeding, seed production, and grow-out techniques for *Hippocampus kuda* and *H. barbouri* by AQD
5. Cetacean Research in Southeast Asian Waters: Cetacean Sighting Program by TD
6. Stock Enhancement of Sea Cucumber *Holothuria scabra* in Vietnam by AQD
7. Research on stock enhancement of sea turtles by MFRDMD
8. Information gathering from Member Countries on sea turtle poaching by MFRDMD
9. Responsible fishing gear (C-hook in hook-and-line fishing) to sea turtle by TD
10. Survey of shark utilization in Southeast Asia - DNA analysis of shark fins by MFRD

species. In order to ensure the sustainable exploitation and conservation of such species, regional technical consultations should formulate future follow-up actions besides formulating regionally coordinated positions. Moreover, SEAFDEC Member Countries should identify enforcement-related difficulties and constraints that may arise when certain species are proposed to be listed in the Appendices of CITES and develop the country's capacity to conduct Non-detrimental Finding (NDF) studies.



Above: Sea turtle entangled in abandoned fish aggregating devices with garbage in the Andaman Sea (SEAFDEC, 2009b); and Left: Sea turtle eggs are still being collected in many countries of Southeast Asia for human consumption (SEAFDEC, 2009b)

Furthermore, SEAFDEC would foster closer cooperation with FAO and CITES in order to help the ASEAN countries in developing and implementing programs for the establishment of National Plans of Action and adoption of standardized sets of commodity codes for products that are both CITES-listed and non-listed species. Moreover, there is also a need to monitor the harvest and trade (export, import and re-export) of the various threatened species. However, more funds and more human resources would be needed to be able to deal with the increasingly complex aquatic species trade dynamics.

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