Annex 14

REVIEW OF ASEAN MARINE TURTLE CONSERVATION AND MANAGEMENT PROGRAM

Kamarruddin Ibrahim[1] and Ibrahim Saleh[2]

1. Turtle and Marine Ecosystem Center (TUMEC), Department of Fisheries Malaysia, 23050 Rantau Abang, Dungun, Terengganu, Malaysia
2. Marine Fishery Resources Development and Management Department, Southeast Asian Fisheries Development Center (SEAFDEC), 21080 Chendering, Kuala Terengganu, Malaysia

1. INTRODUCTION

Marine turtles have a long and ancient history. They arose in a period of more than 100 million years ago during the rise and reign of the dinosaurs. These ancient mariners have survived and flourished the oceans up until recent times. However, their numbers are now dramatically reduced to the point that all seven extant species are categorised by the World Conservation Union (IUCN) as either endangered or threatened on a global basis. Two of these animals, i.e., the hawksbill turtle (*Eretmochelys imbricata*) and the leatherback turtle (*Dermochelys coriacea*) are now on list of the 'critically endangered' animals, meaning that they will become extinct in a very near future if the present pressures remain. Many populations are already extinct, leaving only a few are unaffected.

Aside from natural mortality, there is no doubt that human interference is one of the major root causes of the decimation of turtle species and the declines of their populations. The human-associated impacts work at every stage of turtles' life cycle ranging from the loss of their critical habitats, turtle and egg harvest, to mortality due to irresponsible fishing practices. Pollutants and non-biodegradable waste also harm them. In addition, an inappropriate management acts to fasten the declining process.

Conservation and management of turtles in the Southeast Asian region have been attempted in almost all countries at varying degree of the implementation and progresses. Recent years saw an increase of awareness and concern about tackling turtle issues at regional level. This paper presents a brief overview of the population status and threats, and an update of the programs and initiatives that are in place in the Southeast Asian region.

2. POPULATION STATUS

Currently, there are seven recognised marine turtle species in the world. Most species have circumglobal and subtropical or tropical distributions. Except the species of Kemp's ridley turtle (*Lepidochelys kempi*) which is endemic to Mexico, the other five species of marine turtles have been recorded in the Southeast Asian region. The greens (*Chelonia mydas*), leatherbacks (*Dermochelys coriacea*), hawksbills (*Eretmochelys imbriicata*), olive ridleys (*Lepidochelys olivacea*), and loggerheads (*Caretta*) all are reported to nest on selected beaches of the Southeast Asian countries. The flatback turtle (*Natator depressus*) which the species is endemic to Australia is also reported to occur in eastern Indonesia.

Green turtles are widely distributed throughout the region. The highest concentration of green turtle population is found in Northern Borneo covering the area of Sabah, Southern Philippines, and Northern Kalimantan (Limpus, 2002). There are many small nesting populations scattered all over the region such as in Terengganu (Malaysia) and Pangumbahan (Indonesia), where information about their sizes is available. However, there are also many breeding populations where nesting numbers have not been quantified. Declines in all populations of green turtles in the region have been documented in many reports. However, the one in Sabah, Malaysia has recently stabilised (Basintal & Lakim, 1994; Limpus, 1995; Basintal, 2002).

For the leatherbacks, the area that runs from north western Irian Jaya out into the Solomon Islands is the last remaining stronghold nesting population of this species in the region (Limpus, 2002). Leatherbacks are also found to nest in small numbers in the other parts of Indonesia, Myanmar, Cambodia, Thailand, Vietnam, Philippines and Malaysia. The nesting population of leatherbacks in Terengganu, Malaysia used to be large in 1950s (about 10,000 nests) and it has dramatically declined to only 21 nests in 2001. Nesting trends of all populations show a decline at varying rates.

Hawksbill turtles are also widely distributed in the region. However, their numbers are much smaller than the greens. The information about their nesting numbers is deficient in many places where they are reported to nest. Sabah Turtle Islands in Malaysia are considered as one of the most significant hawksbill rookery in the region. These islands host 500-600 nests annually. Substantial harvest of turtles and eggs is one of the main threats to almost all hawksbill populations in the region, leading to their continuous declines. The population of Java Sea, Indonesia has declined by 70% and is linked with the export of shells (bekko) and stuffed turtles to Japan until 1991, increase in human population and coastal development, and egg exploitation (Suganuma *et al.*, 2002). The population of hawksbills in Sabah Turtle Islands is the only one in the region where their numbers are apparently increasing. After 25 years of strong protection, hawksbill nesting has increased more than tenfold since 1969 (Limpus, 1995; Basintal, 2002).

The olive ridleys remain the world's most numerous turtles but they occur outside the Southeast Asian region, particularly in Orissa, India (Limpus, 1995). Within the region, small numbers in the figures of tens of nesting females are reported to nest, mainly in Malaysia, Thailand, Indonesia, and Philippines. Information about nesting numbers is lacking. Like the other species, olive ridley turtles have also declined. The olive ridley population in this region is genetically different from the ridley that nests in India (Limpus, 2002). Therefore, the conservation of olive ridleys in this region should continue even though their numbers are small.

The last two species of turtles are the least occurrence in the region. Loggerheads are obviously found to nest in Australia and Japan. Highest concentration of loggerhead nesting turtles in the world is in Oman. In the Southeast Asian region, there are scattered reports that loggerheads nest in Indonesia (Sulawesi and Ambon), Philippines (Batan Island and Albay), Myanmar, Cambodia and Vietnam. However, their status is poorly documented. The flatback turtles are endemic to the Australian continental shelf and their nesting populations are approximately five to ten thousand females per year. This species is reported to occur in Indonesian water but they do not nest. Most populations have never been monitored (Limpus, 1995).

3. THREATS

Marine turtles have suffered severe declines worldwide because of a number of human impacts. Among the threats that marine turtles face, are the intentional harvest, the incidental mortality in fisheries, and the habitat loss and degradation due to development and erosion.

In some countries, marine turtles are hunted for their meat and shells because of the culture and socio-economic reasons. The largest slaughter of green turtles on a global scale occurs within the Australasian region, including Indonesia, Papua New Guinea, Australia, Solomon Islands, Vanuatu, New Caledonia, and Fiji where, an estimate of 100,000 turtles are harvested every year (Limpus, 1995). In Kai Island, Indonesia traditional belief and rituals, known as *adat*, are associated with the hunt of leatherback turtles. *Adat* also prohibits the sale or trade of leatherback meat. The practice has long been in existence and it is estimated that the takes by villagers are approximately 100 turtles in one season (Suarez, 2000). Hard-shelled turtles are taken for traditional feasts, sustenance, and to generate some extra income to villagers. Suarez (2000) reported that a number of 173 greens, 87 hawksbills and 3 olive ridleys were captured in Kai waters during a six-month study. In Indonesia's Aru archipelago, the exploitation of marine turtles remains a major threat. Data derived from field observations and interviews in 1997 and 1998 gave an estimate of over 5,000 green turtles are taken each year by both locals and outsider hunters (Dethmers, 2000). Traditional utilisation of green turtles in Indonesia has taken place for centuries as part of the Balinese culture (Agus, 2002).

The declines of marine turtles have strong linked with long term intentional egg harvest that takes place in almost all countries in the region. Eggs are exploited for consumption or to generate income. The classic example is the dramatic decline of leatherbacks in Terengganu, Malaysia as a result of total egg harvest prior to 1961. As census data on egg production and nesting numbers in Peninsular Malaysia improved since 1984, the proportion of egg harvest can be quantified. Recent figures indicate that the overall egg harvest of all species in the Peninsula is in the region of 40%. The proportion of egg harvest has gradually decreased as the government put emphasis its strong efforts towards total hatchling production. Elsewhere in the region the egg harvest has not been fully quantified because the egg production census data lacks.

Incidental catch in fisheries is widely recognised as a major cause of turtle mortality in the sea. Current information indicates that the major sources of marine turtle mortality by fishing gear worldwide are trawling, pelagic and bottom longlines, gill/entanglement net or entrapment gear, entanglements in buoy or trap lines, and hooks and lines from commercial and recreational fishing (Oravetz, 1999).

Trawls are non-selective and highly efficient gears for catching fish, crustaceans and molluscs of various species. Trawls come in different types and sizes, and are operated in both coastal and offshore waters. Current review of the threats to marine turtles in the USA by the National Research Council (1990) has singled out that shrimp trawling as the most important human-induced mortality to juvenile, sub-adult and adult turtles. Annual mortality of loggerhead and Kemp's ridley turtles by shrimp trawls was estimated about 5,500-55,000. Based on rate of capture documented in the USA, the estimate of annual mortality of marine turtles in shrimp trawls worldwide is around 150,000. A number of mitigating measures has

been recommended. Among the options is the use of excluder devices such as TEDs, reduced tow time, and/or time and area closure.

Pelagic or vertical longlines are used to catch pelagic species such as billfish, tunas, and sharks. These baited longlines are normally deployed along frontal zones with high topographic relief and high biological productivity where turtles also aggregate. In most cases, the animals caught on longlines whether they are hooked or entangled, are subsequently released alive. However, evidence shows that the hook-injured animals subsequently die. Billions of hooks are set in ocean each year. In the U.S. Atlantic Ocean swordfish fishery, a number of 1,218 marine turtles were taken in 1992 (Oravetz, 1999). Likewise, the Western Pacific longline fishery takes an estimate of 2,182 marine turtles each year (Brogan, 2002). A report concluded that more than 20,000 sub-adult loggerheads are hooked annually by the Spanish longline vessels in the eastern Atlantic and in the Mediterranean Sea (Anguilar *et al.*, 1995). Mitigating measures including reduction of fishing effort in the vicinity when marine turtles occur in concentrations, limiting entrants to these fisheries, setting seasonal limits based on turtle distribution, and reducing soak time are options to deal with the longline-turtle interaction.

Gill or entanglement nests also have considerable impact on sea turtles. Two types of gill nets are commonly used in fisheries around the world, namely, the pelagic (deep ocean) drift nets and the coastal gill nest. This indiscriminate type of fishing gear can take non-target species including marine turtles, marine mammals, seabirds and other marine life. Mortality of marine turtles entangled in Chilean gill nets is estimated to be 80% (Frazier and Montero, 1990). Prevention measures are of similar options to the ones recommended for reducing mortality of turtles in longline fishery.

The other threats include coastal development that demolishes important nesting sites. Sand mining and reclamation destroy seagrasses, which are feed for green turtles and dugongs. Light pollution from houses and other buildings disorientates hatchlings away from the ocean. Pollution like plastic bags is often mistaken for food, and ingested, blocking their intestines and potentially killing them. In places where tourism flourishes, there are cases of turtle's die due to propeller strikes. Lack of knowledge is another contributing factor adding the list of turtle threats. A case in point is the reduced hatch success of turtle eggs and the zero hatching of leatherback eggs in Malaysia in 2001. Both have strongly been associated with human interference through the practice of artificial incubation.

4. CONSERVATION AND MANAGEMENT

Research

A number of government agencies, universities and NGOs are principally involved in research activities in the region. Quite often the intensity and types of research carried out in each country are strongly influenced by the availability of funds. Migration study to gather geographical distribution and the other biological information was first attempted through flipper tagging. Long term tagging programme for adult leatherback turtles was first initiated in Terengganu, Malaysia in 1967. Accumulated tag and recovery data until 1979 resulted in an understanding of geographical distribution of these animals in the South China Sea (Leong and Siow 1980; Chua 1988). Most turtles tagged in Terengganu have been incidentally caught in the waters of Hawaii, Taiwan, China, Japan, Indonesia, and Malaysia

(Sabah and Sarawak). The Philippines recorded most of the recovery data. This prompted the prediction that leatherback turtles that nest in Malaysia returned to their feeding grounds in these countries. Pre-nesting and post-nesting migrations of leatherbacks in the South China Sea seem to coincide with southbound and northbound surface current, respectively. The potential feeding areas for leatherbacks have recently been confirmed by reports that jellyfish season in the Philippines and Indonesia occurs during early months of the year, which also coincides with the off-breeding period of the Malaysian leatherback population.

In general, information regarding local and long-range movements of marine turtles in the region is still lacking. However, recent years saw a growing interest of scientists in the Southeast Asian countries to participate in satellite telemetry studies such as the ones carried out by Liew *et al.* (1995) and the cooperative research initiated by Japan through the SEASTAR 2000 project. Evidence from these studies indicates the green turtles are not residence animals. Instead, they migrate to and from their breeding areas in thousands of kilometres away from their feeding areas. Satellite telemetry has potential in gathering quick information about turtle migration (post-nesting, inter-nesting and routes) as well as identifying feeding areas. Research programme through satellite telemetry should be intensified in the region so as to have a comprehensive idea about turtle geographical distribution and population units, both are crucial for a proper regional conservation. This programme should also include the study of DNA stock identification, the assessment of all sources of turtle mortality, and the identification of key nesting and foraging areas.

Regional Cooperation

The highly migratory in nature of marine turtles as indicated by tagging and satellite telemetry conducted within and outside of the region obviously confirm the need for regional cooperation to ensure effective management. It is fortunate that there are a number of significant programmes and initiatives currently in place in the Southeast Asian region. Among those are the TIHPA (Turtle Island Heritage Protected Areas), SEAFDEC's marine turtle research and conservation network, the Memorandum of Understanding on ASEAN Sea Turtle Conservation and Protection, and the Memorandum of Understanding on the Conservation and Management of Marine Turtles and Their Habitats of the Indian Ocean and Southeast Asia. The latest in the list is the Southeast Asian Sea Turtle Cooperative Research or SEASTAR 2000, a research project involving Japan and a few ASEAN countries. Working on the existing platforms, it is foreseeable that the achievement in the context of regional turtle conservation can be tremendous if the constraints such as lack of financial mechanism are sort out.

5. RECOMMENDATIONS

- Conservation and management of marine turtles to date primarily encircle on nesting beaches and are contradict with the nature of turtles themselves that spend most of their time at sea. This gap needs to be addressed urgently and appropriate actions are taken to redirect efforts that emphasis in-water conservation and management.

- Conservation and management should be knowledge-based efforts. Recent population modeling suggests that conservation of eggs and hatchlings without concurrent conservation of older stages in turtle life cycle may be of limited value. The use of halfway technology should be avoided.

- The integrated management is crucial to marine turtle conservation. It should (i) incorporate coastal management to ensure ecosystem functions and habitat quality are maintained, (ii) integrate across its entire geographical range including local, national, and regional/international levels, and (iii) blend all conservation tools including management measures, research and monitoring, public awareness, education and information, capacity building, community participation, and effective communication. Adopt guidelines provided by a number of established documentation and conservation management plans.

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