Sea turtle exploitation from Tamil Nadu, Southeast coast of India

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ABSTRACT

The present observation was carried out on sea turtles along the southeast coast of Tamil Nadu during June 2012 to May 2013. Curved Carapace Length (CCL) and Curved Carapace Width (CCW) were measured when the carapaces of dead turtles were found intact. Data on exploitation of turtles were collected by regular observations of turtle carapaces found near ditches, unused buildings and inside thickets that bordered the coastline. The average size of encountered green turtles was 92.4 cm CCL (SD±14.6) and 88.3 cm CCW (SD±15.4). The mean size of olive ridley carapaces was 80.2 cm CCL (SD±10.0) and 77.1 cm CCW (SD±11.16). For hawksbills, CCL was 68 cm (SD±10.4) and CCW was 60.33 cm (SD±13.8). Green, olive ridley and hawksbill turtles show an exploitation ratio of 61.9%, 34.2% and 3.9% respectively during the June 2012 to May 2013.

Keywords: Exploitation, observation, sea turtles, carapace, size, mean.

Abbreviation: Curved Carapace Length (CCL), Curved Carapace Width (CCW)

1. Introduction

Marine turtles have swum in the world’s oceans for over 100 million years. The only widely distributed marine reptiles, many species migrate for thousands of kilometres and even across entire oceans between feeding and nesting grounds. An integral part of coastal and marine ecosystems, they have also been fundamental to the culture of coastal societies for millennia. But human activities over the past 200 years have massively tipped the scales against the survival of these ancient mariners[19]. Today there are seven species of marine turtles in the world. Four of them were observed on the coast of Tamil Nadu and in the region (Chelonia mydas - green turtle; Eretmochelys imbricata - hawksbill; Lepidochelys olivacea - olive ridley; Caretta caretta - Loggerhead turtle). The Indian Ocean offers therefore a good environment as a habitat for turtles. Thus, the turtle can be regarded as the emblematic animal of the region. Where she herself was born to lay its eggs! It is therefore essential to preserve the nesting sites of turtles. The feeding sites of turtles are coral reefs, lagoons and sea grass (a sort of marine prairie).

Slaughtered in the millions for their eggs, meat, skin, and shells, their already reduced populations still suffer from poaching and over-exploitation, as well as incidental capture in fishing gear and habitat loss and alteration. Today, six of the seven living species are classified as Endangered or Critically Endangered. Concerted conservation efforts have seen turtle populations recover in some areas, but without urgent global action the future of these magnificent animals looks increasingly grim[19].

Sea turtles have been used for local consumption since time immemorial providing food (oil and protein) as well as other commodities (bone, leather and shell) to coastal people around the world[18]. Their shells are widely used for the production of various curios. There are four species of sea turtles found in the Gulf of Mannar[19]: green (Chelonia mydas, local name: Paer aamai), olive ridley (Lepidochelys olivacea, local name: Yeth aamai), leatherback (Dermochelys coriacea, local name: Ezhuvari aamai) and hawksbill (Eretmochelys imbricata, local name: Kilimooku aamai). Turtle fishing was practised in this region for ages and cheloniens were exported to Sri Lanka and other countries until a couple of decades ago[1,8]. Prior to 1972, there was legal live turtle trade between India and Sri Lanka. Live turtles were transported by sailing boats from Pamban, Tamil Nadu to Jaffna, Sri Lanka[9] and turtle shells were exported to France, U.K. and several other European countries.
In 1960, it was estimated that an average of about 3000 to 4000 turtles were landed every year in the Gulf of Mannar area and 1000 turtles in the Palk Bay; green turtles formed 75% of the landings, and olive ridley and loggerhead formed 20%[18]. The turtle trade was stopped in the early 1980s. The Indian Wildlife Protection Act (1972) lists all species of marine turtles in Schedule I, thereby giving them the highest degree of protection.

1.1 Accidental catch

The operation of trawlers in this area not only increased fish catch but also resulted in a substantial increase in the accidental catch and mortality of sea turtles. A recent study of sea turtles off the Tamil Nadu coast revealed that fishing is one of the major causes of turtle mortality there[4]. Although rates of accidental catches of sea turtles are relatively high in this area, most of them go unreported or unnoticed. Accidental catch of olive ridleys, *Lepidochelys olivacea*, was reported at Pamban[13] and off Dhanushkodi[14]. The accidental catch of leatherback turtles, *Dermochelys coriacea*, was reported from Dhanushkodi[14], Rameswaram[15] and Mandapam[16]. Due to more attention in recent times to the conservation and management of sea turtles[9], the stranding of turtles has been reported more frequently[12].

Recently, another threat has emerged in the form of dynamite fishing along the 19 km Rameswaram to Dhanushkodi coast. Dynamite fishing is practiced to catch fish, particularly soles, along the coast of Tamil Nadu and Kerala. Dynamite fishing in the Chaliyar River, north Kerala was reported[17]. Dynamite fishing is regularly practiced in the Rameswaram area, which often causes the death of endangered species, such as dolphins and sea turtles. Regular and continuous dynamite fishing operations caused the death of more than 10 turtles which were washed ashore during the end of January 2004 along the Rameswaram to Dhanushkodi coast. Tens of thousands of marine turtles are killed deliberately each year in the developing world as a source of protein and cash revenue. Poverty and cultural mores, coupled with weak (or non-existent) governance and enforcement, contribute to this problem. Exploitation is particularly serious in parts of Asia and the Western Pacific where tens of thousands of green turtles are killed for food each year. Along the Eastern Pacific coast of Mexico, despite complete protection, green turtles are still very much at risk from continuing exploitation. A voluminous, legal, commercial harvest of green and hawksbill turtles by the Wayuu community persists in the Pacific islands, increases in exploitation accompanied the decline in traditional taboos on turtle hunting, which has significantly reduced turtle populations. In West Africa eggs are collected and marine turtles are killed for food, medicine and use in voodoo ceremonies. Egg collection on many turtle nesting beaches is also a very serious threat, especially in Southeast Asia where a culture of legal egg collection leads to the removal of tens of thousands of eggs a practice which has contributed to the local extinction of leatherbacks in Malaysia. Within the last several decades extensive egg collection and the killing of adult turtles in Indonesia has resulted in huge population declines throughout the archipelago. Despite protective legislation, many eggs produced each year in Central America are still collected for subsistence or commercial use. Hunting and egg collection continue throughout the Indian Ocean. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has prohibited all international commercial trade in marine turtles since they were listed on Appendix I of the Convention in 1981. Over a period of years, CITES has been a powerful tool in reducing international turtle commerce, but its restrictions have no legal effect on domestic trade. Some countries however have imposed more strict domestic measures, in response to the conservation status of the species, and the heightened awareness produced by the Appendix I listings. The participation of local communities and the need to incorporate conservation in socioeconomic development are both critical to the success of marine turtle conservation in the developing world, because exploitation of turtles is often driven by a lack of economic alternatives. Programmes which can provide economic alternatives to exploitation and wellbeing to communities demonstrate that turtles are ultimately more valuable alive than dead. Education and outreach are crucial to changing attitudes and instilling a conservation ethic that will be sustained over time[7].

2. Methodology

2.1 Study area

The present study observations on the exploitation of various species of sea turtles along the Southeast coast of Tamil Nadu, Kovalam (N12°47.357'), Mahabalipuram (N12°37.105'), Puducherry (N11°55.386'), Cuddalore OT (N11°43.315'), Parangipettai (N11°31.602'), Poombuhar (N11°08.685'), Karaikkal (N10°54.938'), Nagapattinam (N10°44.694'), Kodiakarai (N10°16.481'), Rameswaram (N09°16.573'), Dhanushkodi (N09°11.930'), Mandapam (N09°16.611') and Punnakayal (N8°38'13.10", E-78°6'56.90") from June 2011 to July 2012.

2.2 Field methods

Turtle mortality was estimated through direct observation of dead turtles washed ashore and from reports published in the newspapers. Curved Carapace Length (CCL) and Curved Carapace Width (CCW) were measured when the carapaces of dead turtles were found intact. Data on exploitation of turtles were collected by regular observations of turtle carapaces found near ditches, unused buildings and inside thickets that bordered the coastline. Monthly observations in the above areas were made carefully to determine the extent of mortality of turtles. Turtles usually get caught in ray nets, locally known as *thirukka valal*[5], which are similar to the *pachyvalai* gillnets[6]. In the study area, gillnets were mostly used for fishing. Gillnets are set in shallow waters and left for about 8 - 10 hours. Turtles that are entangled in the nets commonly die, either due to asphyxiation, or the fishermen chop off the flippers and/or club the head of live entangled turtles, to remove them from the net[8]. During monthly patrols, each encountered carapace was assigned to a species using key characters such as the number and pattern of scutes and their colouration; they were measured to the nearest cm for curved carapace length (CCL) and curved carapace width (CCW) using a flexible tape. The location of the carapace was noted. Then it was photographed and tagged with paint. Those carcasses found in ditches were also visually counted and identified and data noted on the location where it was found (Fig 1). Additional information about the incidental capture of turtles was obtained through informal discussions with fishermen and other members of the local community.
All marine turtles, including their eggs, are listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) making any commercial trade across international borders illegal. Marine turtles are increasingly threatened by poaching of their eggs for commercial sale. Meat and shells of marine turtles, as well as whole stuffed specimens, are also illegally sold.

3. Results and Discussion

Exploitation of three species of marine turtle was identified during the two sets of surveys: olive ridley, _C. mydas_ and _Caretta caretta_. The number of fresh skulls from the night preceding the survey of the beach, the number of old skulls that were more than one night old and the estimated size of the turtle exploitation for the beaches with recorded turtle during survey are summarised below.

The average size of encountered green turtles was 92.4 cm CCL (SD±14.6) and 88.3 cm CCW (SD±15.4). The mean size of olive ridley carapaces was 80.2 cm CCL (SD±10.0) and 77.13 cm CCW (SD±11.16). For hawksbills, the mean CCL was 68 cm (SD±10.4) and CCW was 60.33 cm (SD±13.8). Green, olive ridley and hawksbill turtles show an exploitation ratio of 61.9%, 34.2% and 3.9% respectively during the study period from June 2012 to July 2013. Agastheesapillai[1] reported that green turtles constituted 89% of all turtles caught in the Gulf of Mannar and Palk Bay during 1971 and 1976.

Green turtles were observed every month, with a peak in mortality and exploitation (Figure 2). Olive ridley turtles were also captured nearly every month, with a peak in August. As reported by local fishermen, olive ridleys substituted for the unavailability of greens. The abattoir of turtles was opened mostly on Sundays. Turtle meat price ranged from Rs. 120–150 for green turtles and Rs. 100–120 for olive ridleys. Hawksbills were not consumed because the local people were fearful of being poisoned by the meat[6]. During this study, out of three hawksbill turtles, two were hit by propellers and one was caught in a net. But in the case of greens and olive ridleys, all of them were caught in fishing nets. Some people in the area reported that turtle meat and blood cured diseases such as piles and tuberculosis.

This study reveals the pattern of current exploitation of sea turtles along the Southeast coast of Tamil Nadu. Most of the fishermen confirmed that those turtles that were entangled in nets and were still alive were taken for consumption. Sea turtle populations in this area have been reported to have declined due to their over-exploitation for trade and from accidental drowning in fishing gear such as gillnets and trawlers[2]. This study therefore recommends that government officials should periodically check whether fishermen use TEDs (Turtle Excluder Devices) in their fishing nets. Moreover, the state fisheries department and forest department must ensure strict enforcement of the law in this regard. Unless this is done, it will not be possible to stop the exploitation of turtles in the Tamil Nadu coast (especially in Rameswaram, Mandapam and Tuticorin).
4. Conclusions
As sea turtle populations decline, so does their ability to perform vital roles in maintaining the health of the world’s oceans. Death, Exploitations and injury in commercial fisheries, loss of important habitat, pollution and climate change are among the many human-caused threats pushing sea turtles towards extinction. More proactive conservation measures are needed to protect sea turtles and rebuild their populations to healthy levels so they can fulfill the full extent of their historic roles in ocean ecosystems. At historic levels, sea turtles will help restore the health of our oceans and make them more resilient to future threats[180]. The following actions must be taken to protect and restore sea turtle populations:
• Reduce sea turtle interactions and mortalities in commercial fisheries.
• Protect key habitat areas on land and in the water
• Pass comprehensive legislation that establishes a system to protect and restore sea turtle populations

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6. Reference