

# CONSERVATION OF MARINE TURTLES

Press Note

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Coastal zone represents 18% of the earth's surface, providing space for 60% of the human population, since about 70% of the world's cities with population more than 1.6 million are located in the coastal zone. 90% of the world fish catch is obtained from this zone. Interestingly, the hydrosphere of the coastal zone is only about 8% of that of the world ocean but represents about 18 to 33% of total primary production. This zone is bio-geochemically more important as it buries and mineralises 80-90% of organic matter and serves as a sink for an estimated 50% of the global carbonate deposition. The coastal waters also receive discharges of suspended matter associated with elevated levels of pollutions from major rivers and this accounts for 75 to 90%. This zone has high biological potential as it serves as feeding, nursery and spawning grounds with rich biodiversity and as an intermediary biotope between marine and freshwater environments.

Coastal ecosystem plays a vital role in India's economy by virtue of their resources, productive habitats and rich biodiversity. India has a coastline of 7,516 km of which the mainland accounts for 5,422 km. Lakshadweep 132 km and Andaman and Nicobar islands for 1,962 km. Nearly 250 million people live within a distance of 50 km from the coast, The coastal area is assuming greater importance in recent years, owing to increasing human population, urbanization and accelerated developmental activities. The coastal regions are thus, a place of hectic human activity and the coastal ecosystems are now highly disturbed and very much threatened. Current approaches to the management of coastal resources are not capable of maintaining sustainable development and the coastal environments and resources are being rapidly degraded and eroded in India. Marine turtles are large, air-breathing reptiles that live in tropical and sub tropical seas throughout the world. Fossil turtles date back to the Triassic Era some 200 million years ago.

The most obvious characteristic of this group of reptiles is the presence of a protective shell. The shell is composed of three parts – an upper shell or carapace attached to the lower plastron by a bony bridge. Instead of teeth, turtles are

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\* Key Note address delivered during Flipper Festival – 2007, on 1<sup>st</sup> September, 2007 in Loyola College, Chennai.

equipped with a horny bill. Marine turtle limbs have evolved into flippers and their body shape is streamlined. Turtles, like all reptiles, are cold blooded (ectothermic). Their body temperature is the same as their surroundings. And all present day turtles lay eggs. Marine turtles typically mate at sea a few weeks prior to nesting and only the females come ashore to nest. The males are never found on the coast, though they have been sighted in the coastal waters. Nesting activity normally takes place in the cover of darkness. Female turtles dig nest, which is flask shaped beyond the high water mark with the help of their flippers. Each female would lay approximately 150 eggs, which are ping-pong (table tennis) ball size and soft shelled.

Incubation period for these eggs is usually between 50-70 days depending on the species. The eggs are closely packed and in contact with one another. Metabolic heating within the nest helps to speed up the hatching process in the final stages of incubation. The gender is temperature dependent, meaning higher the temperature more number of females, lower the temperature more number of males. The hatchlings emerge at night and head towards the sea guided by the glow of the moon and the stars, coupled with the sound of the waves. While they walk towards the sea imprinting takes place that enables them to return to their natal beach for nesting when they mature. Marine turtles are subject to dwindling habitation - nesting sites and foraging sites. Despite international recognition of critical status, their population has been decreasing rapidly. Five species of marine turtles found in this region are classified as endangered and therefore require urgent action for their conservation. South Asian waters provide a feeding and developing ground, and a migratory corridor. Unfortunately, the major nesting beaches are in the area where the human population density is very high.

According to the Hindu mythology, the God of preservation, Lord Vishnu, was reincarnated as a 'Kachhapa' meaning turtle. Lord Vishnu as a turtle is believed to have carried the earth on his back. In Andhra Pradesh if a live turtle is caught in net, the boatmen apply vermilion pray to it in order to bring prosperity and release it back to sea. But in the modern times, these religious sentiments do not hold true.

Threats to the marine turtle are on the rise which has drastic impact on their survival rate. Scientists believe that the presence of marine turtles in the marine ecosystem indicates the health of the sea. Threats to marine turtles are not just from natural predators like sharks and natural demographic changes but also from predators on land – humans and animals and birds alike.

The Department of Environment and Forests has the pivotal role in the conservation and management. However, over the years NGOs and other relevant agencies like Coast Guard (in some parts of India) have also joined hands of the management authority. Despite legal protection accorded to marine turtles under the Indian Wildlife Protection Act (1972), and in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna & Flora (CITES), the population is on a world-wide decline. Though there exists no commercial or international trade in marine turtle meat & products in India, the numbers frequenting the coast has steadily declined. Large-scale turtle mortality resulted in the US embargo on shrimp export from India. Sustainable fisheries with use of bycatch reduction devices specially. Turtle Excluder Devices (TEDs) needs to be promoted. Community participation is essential to facilitate conservation in nesting sites.

Lake  
Tree  
Foundation

Five of the seven species of marine turtles are found in Indian coastal waters and at least four have significant nesting beaches and/or feeding areas. Many turtle populations in Indian coastal waters are seriously affected by incidental catch in fisheries, coastal development, habitat loss and depredation of eggs. As a part of this collaborative project, monitoring programs and networking were initiated in Gujarat, Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu on the mainland coast of India and in the Andaman and Nicobar Islands. These programs were carried out by four partners including the Andaman and Nicobar Environmental Team, Bombay Natural History Society, Gujarat Institute of Desert Ecology and the Salim Ali Centre for Ornithology and Natural History. Index beaches were monitored during the nesting season in Gujarat, Maharashtra, Goa, Kerala, Tamil Nadu and the Andaman and Nicobar Islands. Forest Departments in each of the states and non-government

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organisations that work on sea turtles were contacted in each of the states, and workshops were conducted for capacity building and training. Tags were purchased to reinitiate PIT tagging of leatherback turtles in Great Nicobar Island and metal tagging of other species in the islands and on the mainland coast of India. However, tagging could not be initiated at some sites due to lack of permits. In the Andaman and Nicobar islands, the December 2004 tsunami destroyed many nesting beaches including Galathea, where the main monitoring program was being carried out. The project especially aimed at consolidating coastal surveys of populations and assessment of threats to sea turtles, and establishing mechanisms that will enable long term monitoring and conservation actions, by building capacity and networking with local institutions. This has been achieved to some extent, with the formation of a network of local non-government organisations. These organisations will be supported as a follow-up to this project to further sustain sea turtle monitoring and conservation along the coast.

Among the five species of sea turtles distributed in the Indian region, four of them, the Olive ridley (*Lepidochelys olivacea*), Green turtle (*Chelonia mydas*), Leatherback (*Dermochelys coriacea*) and Hawksbill (*Eretmochelys imbricata*) nest within the Indian limits. All of these species are distributed in Tamil Nadu and at least four species are found within the coastal areas of Kerala. The Wildlife Institute of India (WII) recently implemented a UNDP - Government of India sea turtle conservation Project. This project (2000 - 01) evaluated the status of marine turtles and their nesting habitats in all maritime states of India, which included an assessment of threat to the survival of turtles. Data on important nesting beaches were generated, which formed the benchmark for future assessments and monitoring. Among many aspects, monitoring population trend of a species is critical for the preparation and implementation programs for any species. As a part of the present CMS - MCBT project on the marine turtles, the Sálim Ali Centre for Ornithology and Natural History (SACON), Coimbatore has undertaken studies along the Kerala and Tamil Nadu coasts during 2003 - 05 turtle nesting seasons.



**Tamil Nadu: Mamallapuram- Pondicherry:** The Mamallapuram - Pondicherry beach (50 km) was surveyed for only one year (2003 - 04). In all, 36 Olive ridley nests were recorded during the fortnightly sampling from January to March 2004. Peak nesting was observed in the first fortnight of March. Estimated nesting density along this area is about 11 nests / km during January - April 2004.

**Chennai:** The Chennai beach has been monitored (on daily basis) by the Students' Sea Turtle Conservation Network (SSTCN) since 1988 and was continued during this study as well. A total of 50 nests (8.3 /km) were recorded during January - April 2004. During 2005, it was 62 nests (10.3 / km; SSTCN data). Average nesting intensity for 16 years was 9.4 nests / km (Table 3). A hatchery is being maintained by the SSTCN on annual basis. The SSTCN also provides training and awareness programs to students

**Nagapattinam:** The Nagapattinam beach was monitored for turtle nesting during 2003 -04 and 2004 - 05. On the 30 km beach monitored, a total of 17 and 30 nests were recorded during the fortnightly sampling from December to April 2003 and 2005 respectively (Table 4). This works out to be about 7.5 and 15 nests /km. Nesting along this beach was about 20-nests/km during 2000-01. Turtle nesting along the east coast of Tamil Nadu (Chennai and Nagapattinam) occurred during January - March, whereas it was between September and December along the North Kerala coasts. In other words, turtle nested subsequent to the major monsoon season of the respective area, northeast and southwest monsoons. Peak nesting along the east and west coasts were during February and October respectively. Intensity of the sea turtle nesting on the Kerala and Tamil Nadu coasts is sporadic, and its density varied from 3 to 15 nests / km. Reasons for the difference in the number of nests observed along the Chennai and Nagapattinam coasts during 2003 - 04 and 2004 - 05 are unclear. One of the reasons could be high mortality due to incidental catch (see below) in fishing gears during the previous year. However, these differences could be due to certain annual or cyclic changes in the nesting of turtles as well. Further studies may throw better insights in this regard.

**Turtle Mortality:** No carcass of sea turtle was observed along the west coast (north Kerala) during both years (i.e. 2003 - 04 and 2004 - 05). Interviews with fishermen in the area also revealed that dead turtles get stranded along these beaches only occasionally. Along the east coast, 139 turtle carcasses ( $\sim 3$  / km) including 134 Olive ridleys and five Green turtles were recorded on the Mamallapuram - Pondicherry coast during 2003 - 04. During the same period, 92 carcasses including 90 Olive ridleys and two Green turtles were observed along the Nagapattinam coast. The turtle mortality of this area also worked out to be about three turtles / km. Only 21 carcasses (20 Olive ridleys and one Green turtle) were observed during 2004 - 05, and all of them prior to the 26th December 2004 Indian Ocean Tsunami that seriously hit the coastal areas of the Indian region. No new carcasses were observed during January - April 2005. Fishing activities were halted during this period due to the fear/ rumors of fresh Tsunami in the area. Hence, it may reasonably be concluded that mortality of turtles in the area was largely due to fishing activities. Turtle mortality was highest during January on the east coast (Table 6). Prior to/during January turtles aggregate in the shallow waters nearby beach for breeding activities such as selection of mate, courtship and finding appropriate nesting beach. These areas are also important gill net fishing grounds. As mortality data showed that most of the turtles die prior to nesting, and adults are wiped before breeding, this would have serious implications on the survival of the species. Fishermen in the area largely used small mechanized boats and catamarans for fishing. Density of fishing vessels (both mechanised and non-mechanised) was 26 and 28/km on the Mamallapuram and Nagapattinam coasts respectively. In these areas mostly gill nets were for fishing. Gill nets are set in shallow waters and left for about 8 - 10 hours. Entangled turtles in the net die due to drowning. This is evidenced from the everted internal organs through body openings such as cloaca. The fishermen in the area also chop off the flippers or club the head of live turtles found entangled in the net. This is done for removing turtles without much damage to the nets and fishermen themselves. In all, 70% of the fresh carcasses found on the shore had one or two missing flippers and shell or head injuries. Locals of these areas (Chennai, Nagapattinam) do not consume turtles. Inhabitants of south Tamil Nadu (Gulf of Mannar) consume sea turtles. Exploitation Inhabitants of the present

study areas (Chennai, Nagapattinam, North Kerala) do not consume turtles, but they consume turtle eggs. Locals on both Nagapattinam and Mamallapuram- Pondicherry coasts pilfered eggs of a large number of nests. As the beaches were monitored on daily basis by the SSTCN and NGOs along the Chennai and North Kerala coast, exploitation of eggs by Humans in these areas were negligible. These groups (NGOs) have also collected turtle eggs to maintain hatcheries with the involvement of students and local communities. Along the Nagapattinam coast, all the nests found during 2003 - 04 were predated; 14 (82.5%) by Humans and 2 (17.5%) by domestic dogs. Professional poachers traversed the beach extensively on foot during night for collecting eggs.

Of the 36 nests observed during January - April 2004 along the Mamallapuram -Pondicherry coast, 25 (69.4%) were found predated. Among the predated nests, jackal and domestic dog contributed 54.2% and 33.3% respectively. Inhabitants of the area pilfered about 12.5 % of the total nests observed in the area. Native communities such as Irulas consume turtle eggs occasionally. Locals have taken away eggs of almost all nests along the Nagapattinam coast, whereas inhabitants took only 12.5% of them along the Mamallapuram coast. This indicates that the later one is relatively less disturbed. High mortality of adult turtles was observed in both these areas along the east coast due to fishing activities. This shows the existence of high anthropogenic pressure on both adult and eggs of Olive ridley sea turtles.

Along the Tamil Nadu coast, especially on the Chennai and Nagapattinam areas, several Government and Non Government Organisations involve in marine turtle conservation. A brief description on a few important NGOs is given below.

**Madras Snake Park Trust:** The Madras Snake Park Trust (MSPT) maintained the first sea turtle hatchery in 1974 and continued it till 1977. A total of 197 nests were collected during this period. Details on nesting behavior and biology of Olive ridleys were recorded for the first time in India. A large number of students and general public have participated in the turtle walks. Further to this, a countrywide marine turtle status survey was organized by the MSPT during 1981, and this provided the

first information on many important turtle areas such as Gujarat and Tamil Nadu coasts.

**Madras Crocodile Bank Trust:** The Madras Crocodile Bank Trust (MCBT) has been active in providing guidance to NGOs such as SSTCN and TREE and researchers in the region since 1988. Long term monitoring of marine turtles in Andaman and Nicobar islands is being undertaken by MCBT. Students of the Centre for Herpetology in MCBT have been monitoring turtle nesting in Kovalam coast. The present all India (CMS - MCBT) project is being executed by the MCBT involving various Government and Non Government Organisations.

**Student's Sea Turtle Conservation Network:** The Students' Sea Turtle Conservation Network (SSTCN) established its first hatchery in December 1988 when the Tamil Nadu Forest Department decided to close down its sea turtle program. The SSTCN is perhaps the oldest students' network involved in sea turtle conservation in India. Students from schools, colleges and other educational institutes are members of this network. The activity of SSTCN includes beach monitoring, hatchery management, and protection of wild nests, education and awareness. Members of the SSTCN monitor the beach between Besant Nagar and Neelankarai (~6 km) on annual basis.

**Students' Sea Turtle Network, Nagapattinam:** The project team interacted with the locals of the Nagapattinam coast, one of the most important sea turtle nesting beaches of Tamil Nadu and could help forming active groups interested in sea turtle conservation in the area. Two active students' groups were formed during this study; one based at TBML College, Poraiyar and the other at Poompuhar. Both of them monitored turtle nesting on 10 km beach near Tranquebar and Poompuhar respectively. The National Service Scheme (NSS) volunteers from the colleges have been used to popularize the importance of sea turtles among the inhabitants of the area. The students' group at *Draft - March 6, 06 Limited circulation - Not to be quoted UNEP-CMS Sea Turtle Project* Poompuhar has committed to actively monitor



## **SUGGESTIONS FOR CONSERVATION**

The TREE foundation taken excellent initiatives on studying the ecology and adult mortality in five selected villages with members of the five villages. This participatory approach of the cluster village group members played key role in conservation of Olive ridley turtles. I would like to congratulate Dr.Supraja Dharini and her entire team and the members of the five villages for their active involvement in the conservation efforts of Turtles.

As over 50% of the adult turtle mortality occurred during January, closed period for gill net (set net) fishing is suggested. This may be implemented for a month (January) along the east coast. During this period alternate fishing techniques to be used by the fisherman should be explored. Discussions with the concern departments (Forest and Fisheries) and stakeholders need to be done for active participation and effective implementation.

Control of Egg Poaching – Poaching of turtle eggs is wide spread along the entire Olive ridley nesting ranges, and in some areas it is very severe. Egg poaching is more prominent where no protected areas or NGO activities like Tree Foundation are found.

Enhanced beach patrolling by the forest department and other interested parties during the peak turtle nesting season is crucial for their long – term survival. Intensive beach patrolling for two months (Feb – March) on the turtle nesting beaches of the east coast of Tamil Nadu may save as many as 65 to 90% of the nests from poachers. Beach

patrolling during September – October may be ideal along the west coast for the conservation of turtles.

Awareness program and community participation in the conservation efforts made is important for getting desired results. Hatchery program involving public with incentives and alternate livelihood may increase the success of the sea turtle conservation initiatives many folds.

Training –Workshops and training program may be organized for field staff of the forest and fisheries department and researchers providing information on the status of marine turtles, research techniques and problems in conservation, etc. Hands on training programmes to the fishermen of Chennai and Nagapattinam coasts by expert institutions such as CMFRI on how to release the entangled sea turtles in the nets without damage may be very useful.

The nesting season of sea turtles along the east and west coasts was different, and it would be interesting to find if the same population is involved in the nesting along these coasts. Tagging program along both these coasts simultaneously may provide information on the breeding stock, movement pattern of turtles, etc.

Co-ordination among Government and Non-Government organization and local communities needs to be strengthened to insure long-term survival of marine turtles.

Some of the harmful human impacts on marine biodiversity stem from ignorance and lack of understanding of the importance of marine biodiversity and how it can be affected. Marine resources and biodiversity have traditionally been undervalued, which puts marine resources on a lower priority level vis-à-vis land biodiversity. Unregulated use of resources, increased demand for the resources and rapidly expanding coastal development put the marine resources at considerable risk. For a developing country like India, action is hardly ever preventive, but is usually undertaken only after irreversible damage has occurred.