

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 illegal exploitation of turtles in Tamil Nadu coast especially in Rameswaram, Mandapam and Tuticorin.

- Strict rules and regulations for industries near nesting grounds
- Appointment of turtle guards to avoid destruction of eggs by other animals
- Regulation of trawl fishing and ship traffic during nesting season
- Fitting of TED in all trawler gear
- Strict imposition of ban on bottom trawling
- Trained staff with regular inputs from scientific community should monitor and operate hatcheries of sea turtles
- Periodic review of the coastal developmental projects and compulsory EIA and coastal regulation zone certificates
- Implementation of long term monitoring projects from state and central governments
- Dive sites should be protected for conservation and effective management
- Education of fishermen to save the turtles
- Intensive awareness program, publicity of information in local languages for local stake holders

6. Conclusion

Protection and management of turtles on the sea coast is mainly depending upon the control of human interference and predatory disturbances to the breeding sea turtles, breeding ground and the nests. Many conservation groups are working to increase sea turtles population by improving their survival by protecting nesting grounds, nursery areas and etc. Against this back drop, it is considered appropriate to make the following recommendations to be adopted to reorient the future research on this species and save it from further reduction.

- Lights illuminating any areas seawards shall be turned off after 9.00 pm during the turtle breeding and nesting each year

- Local people should involved in the exercise of protecting the adults in coastal waters and eggs and juveniles on the mass nesting beaches with payment of incentives to committed workers
- More studies should be undertaken to locate the actual route of migration and return journey of the adult turtles, so that the offshore developmental activities including fishing and oil exploration can be taken up without any prejudice to them
- Prominent hoardings in Tamil with clear, unambiguous images and text about the protected status of turtles and penalties for violation of TMRA should be erected in prominent places in the fishing villages, during sea turtle nesting / breeding period
- Sea turtles being long distance travelers and do not know their boundary of occurrence in tropical belt, conservation measures should be planned for local, regional and international levels and their integration
- Steps should be taken to develop hatcheries in each mass nesting site to ensure a favorable ambiance during embryo development in addition to protecting the eggs and juveniles due to predation and erosion
- The adjoining areas of sea up to 5 nautical mile from the identified nesting point shall be declared "No Fishing Zone" during the nesting and breeding season of turtles
- Turtle excluding device (TED) shall be fixed in all trawl nets wherever necessary to help escape of sea turtles from trawl net during the turtle breeding season



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Sea Turtle Nesting Grounds Identification and its Conservation along the Southeast Coast of Tamil Nadu



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1. Introduction:

Sea turtles are large, air-breathing marine reptiles that inhabit tropical and subtropical seas throughout the world. They belong to the Order Testudines, which form an integral part of the marine ecosystem. Worldwide, there are seven species, with 5 reported in the Indian coastal waters. Turtles are valued for its meat, oil and carapace. The vital organs of turtle, liver and heart, bones and body scutes finds application in the preparation of medicines for Tuberculosis, Asthma and Bronchitis and for ornamental purpose. Due to its meat and medicinal values, sea turtles were hunted intensively by humans which resulted in worldwide declining trend of stocks over the last few decades. This leads to the declaration of all species of turtles as either vulnerable or endangered species, receiving international attention to focus towards conservation and impact assessment. Some of the major measures taken towards conservation of sea turtles were installations of TED (Turtle Excluder Device) in fishing gears, control of beach erosion and human predation, awareness and education on conservation and biosphere reserves. Conservation of sea turtles in the coast of Tamil Nadu is essential for ecological balance and sustainable ecosystem development.

2. Scientific classification:

Kingdom : Animalia

Sub-kingdom: Metazoa

Phylum : Chordata

Sub-phylum : Vertebrate

Super-Class: Tetrapoda

Class : Reptilia

Subclass : Anapsida

Order : Testudines

Family: Cheloniidae (6) and Dermochelyidae (1)

Olive ridley turtle (*Lepidochelys olivacea*):

Occur in tropical and subtropical waters; Nest on tropical beaches worldwide, mainland and remote islands; Carapace Short and wide, carapace smooth but elevated, tectiform. Usually more than 5 scutes will be present. Pore near rear margin of infra marginals on plastron. Reported maximum

length and weight of Olive ridley turtle was found to be 60 - 70 cm and 40 - 50 kg, respectively.

Green turtle (*Chelonia mydas*): Occur in tropical and subtropical waters; Nest on tropical beaches worldwide, mainland and remote islands; Carapace Broadly oval; margin scalloped but not serrated; 4 pairs of costal scutes are present; color patterns varied from brown with radiating streaks in juveniles but, variable in adults. Head anteriorly rounded, presence of Prefrontal scales (1 pair), Single claw on each flipper, Plastron white in hatchlings, yellowish in adults and other features include Vertebrales (centrals) large, so that first costal does not contact nuchal scute. Reported maximum length and weight of green turtle was found to be 100 cm and 200 kg, respectively.

Hawks bill turtle (*Eretmochelys imbricate*): Occur in tropical waters; Nest on tropical beaches worldwide, mainly remote islands; Carapace oval, strongly serrated posterior margin, thick overlapping (imbricate) scutes; 4 pairs (ragged posterior border) of costal scutes are seen and carapace coloration brown, boldly marked with amber and brown variegations; Head narrow, straight bird like beak with 2 pairs of prefrontal scales. Reported maximum length and weight of Hawks bill turtle was found to be 90 cm and 40 kg, respectively.

Logger head turtle (*Caretta caretta*): Occur in temperate, sometimes subtropical and tropical waters; Nest on temperate and subtropical beaches; Carapace moderately broad, lightly serrated posterior margin in immatures, thickened area of carapace at base of 5th vertebral in adults with 5 pairs of costal scutes. Head was broad and triangular in shape with 2 pairs of prefrontal scales. Two claws on each flipper and plastron color varies from yellow to orange. Reported maximum length and weight of Logger head turtle was found to be 80 - 100 cm and 80 kg, respectively.

Leatherback turtle (*Dermochelys coriacea*): Occur in all oceans, sub-arctic to tropical waters;

Nest on Tropical beaches worldwide; Carapace elongate with seven prominent dorsal ridges; scutes always absent; Coloration black with white spotting; pink or bluish spots on base of neck and flippers; Head triangular in shape with two maxillary cusps; Forelimbs extremely long and Plastron relatively small and distensible. Reported maximum length and weight of leather back turtle was found to be 1.6m and 500 kg, respectively.

3. Breeding and nesting

Sea turtles are oviparous reptiles. The breeding takes place in the shore waters. Both participants remain together for several hours as a mating behavior. The courtship begins in the month of November and ends in February. The female turtles moves 40 to 60 m away from the shore line high tide mark where the bushes and vegetation were present to lay her eggs. The arrival of retreat of female sea turtles formed crawl tracks of fore flippers on the sandy beaches. These were clear on the sand in undisturbed area. According to the shapes of tracks, there are three types, namely; Crescent, Conical and False nesting crawls. The nesting of female sea turtles takes place in early January to late March. Peak nesting was observed to be in the month of February.

• 4. Threats to sea turtles

- Fishing activities
- Illegal harvests
- Global warming
- Hunting of adults
- Egg harvest
- Predation pressure from wild animals
- Beach erosion and egg loss
- Egg loss due to over crowding
- Artificial illumination
- Diseases
- Pollution
- Death due to drowning
- Near shore predation of juveniles

5. Recommendations, suggestions and policy measures

The government officials should periodically check whether fishermen use TEDs (Turtle

SEA TURTLE NESTING GROUNDS IDENTIFICATION AND ITS CONSERVATION ALONG THE SOUTHEAST COAST OF TAMIL NADU

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 Thoothukudi - 628008, Tamil Nadu, India.

Background & Rationale :

- ★ The main motto of this project is to study the existing and spotting the new nesting grounds of turtles.
- ★ For this study, 30 respondents were surveyed randomly to assess the status of conservation at each sampling place. 1000 folders were prepared and distributed to fishers and nearby schools to inculcate the awareness about importance of turtles.



Knowledge level testing at Truchendur, Thoothukudi district on 01/10/2016



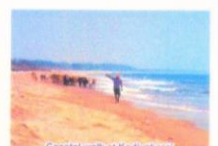
Fisherman interaction during pilot survey at Threspura, Thoothukudi district on 17/10/2016



Pre-Nesting Survey at Veerapandiypattinam, Thoothukudi district



Pilot survey conducted in Colachel, Kanyakumari District on 31/10/2016



Coastal walk at Kodyakarai, Nagapattinam district on 25/12/2016

Approach & Methodology :

- ★ Selection of sampling sites in Tamil Nadu region for identification of nesting ground and assessment of present status of turtles.
- ★ A structured survey were conducted to evaluate the current conservational status of the marine turtles with regard to existing laws and policies.



Visit to fish landing centre at Manapad, Thoothukudi district



Visit to fish landing centre at Threspura, Thoothukudi district



Visit to fish landing centre (Construction) at Dhanushkodi, Ramanadhapuram district



Dead carapace of Olive Ridley found at Veerapandiypattinam, Thoothukudi district on 20/11/2016



Sea Trip at Panbani, Ramanadhapuram district

Objectives :

- ★ To identify the turtle nesting grounds in southeast coast of Tamil Nadu.
- ★ To assess the present conservational status of turtles among the stakeholders by the structured field survey along the southeast coast of India.



Typical sandy beach at Pozhikarai, Kanyakumari district on 30/12/2016



Visit to sea turtle hatcheries at Dhanushkodi, Ramanadhapuram district



Damaged Carapace of Olive Ridley found at Manapad, Thoothukudi district on 05/11/2016



Existing awareness on sea turtle conservation at Veerapandiypattinam, Thoothukudi district



Creating awareness through booklet and folder distribution at Theruvukulam, Thoothukudi district

Risks & Assumptions :

- ★ Incidence of endangered turtles as by-catch.
- ★ Difficulties to collect the exact information from fishers. Hence, repeated surveying and data collection would decrease the bias and increase effectiveness of data.
- ★ Turtle nesting ground will be spotted (on spot field survey) through walking along the selected coastal regions.



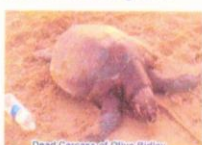
Dead Carcass of Green sea turtle in Ramanadhapuram Coast (Head side View)



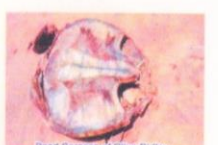
Dead Carcass of Green sea turtle in Ramanadhapuram Coast (Dorsal View)



Dead Carcass of Olive Ridley in Kanyakumari Coast



Dead Carcass of Olive Ridley in Nagapattinam Coast



Dead Carcass of Olive Ridley in Thoothukudi Coast

Outcomes :

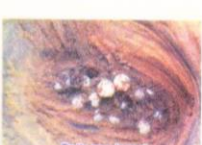
- ★ 10 turtle carcasses, 16 turtle dead carapace shells and 5 nesting grounds i.e. Mankudy, Rajakkamangalam, Veerabagupathy (Kanyakumari dt.); Kodyakarai (Nagapattinam dt.); Manapad (Thoothukudi dt.) were identified through coastal walk of the selected districts of Tamil Nadu with a total distance coverage of 201.75 Kms



Identification of sea turtle tracks at Manapad, Thoothukudi district



Identification of sea turtle tracks at Rajakkamangalam, Kanyakumari district



Turtle eggs in nest



Shell remaining of turtle eggs at Nagapattinam coast



Hatchlings of olive ridley at Kanyakumari

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