

# Threatening of olive ridley sea turtle *Lepidochelys olivacea* (Eschscholtz, 1829) nesting ground and its populations in Kolavipalam beach, North Kerala, India

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## ABSTRACT

A study was carried out to explore the status of threatening olive ridley turtle nesting ground and turtle populations in the Kolavipalam area which covers Tikkoti (11°29'38.634" N and 75°36'54.316" E) to Kottapuzha estuary (11°34'12.151" N and 75°35'26.754" E) of about 8 km, Kozhikode, Kerala, India during the year 1998-99 to 2015-16. Despite the sporadic nature of sea turtles, every individual of olive ridley sea turtle nests were monitored by Theeram volunteers in Kolavipalam region, North Kerala, India from the the last two decades. From that a total of 410 olive ridley sea turtle nests have been recorded. The maximum number of sea turtles nests of 65 nos. has been recorded during the year 1999-2000 and 2000-2001 continuously. The maximum and minimum percentage of hatchlings of 89.29%, 33% observed from the year 2002-03 and 2014-15 respectively. This study will provide the baseline data on medium term status of olive ridley turtles and their nesting populations in Kolavipalam beach, Kozhikode, India.

*Key words:* Nesting, Olive ridley turtle, Theeram, Hatchlings, Incidental

## Introduction

Among the five species of sea turtles distributed in the Indian region, four of them namely olive ridley (*Lepidochelys olivacea*), green turtle (*Chelonia mydas*), leatherback turtle (*Dermochelys coriacea*) and hawksbill turtle (*Eretmochelys imbricate*) nest on Indian coast (Kar & Bhaskar, 1982). They have been frequently carried out long migrations of thousands

kilometers during their life cycle, usually between feeding and nesting areas. All these species are distributed and nested in the coastal waters of Kerala and Lakshadweep islands. The selection of nesting beach was based on accessibility of the beach as well as height and substrate. For nesting purpose, olive ridley turtles prefer wide beaches and sand bars at river mouths. The Central Marine Fisheries Research Institute (CMFRI) had studied with respect to ma-

rine turtle biology and fishery related mortality (Agastheesapillai & Thiagarajan, 1979; Silas & Rajagopalan, 1984; Rajagopalan *et al.*, 1996). Because of many anthropogenic activities, the sea turtles nesting population were decreased and intensive conservation measures were required to conserve these populations. Now a days, many number of Non-Governmental Organizations (NGOs) acknowledge the impacts on threaten olive ridley turtles (Bhupathy, 2007). These groups are currently providing community awareness programmes and pursuing conservation strategies to mitigate the factors which are contributing to a severe decline in local populations. This study mainly focused on the status of olive ridley turtles and their nesting populations in Kolavipalam area, North Kerala, India.

## Materials and Methods

The work survey was carried out in the Kolavipalam area (Figure 1) which covers Tikkoti (11°29'38.634" N and 75°36'54.316" E) to Kottapuzha estuary (11°34'12.151" N and 75°35'26.754" E) of about 8 km, Kozhikode, Kerala, India during the year 1998-99 to 2015-16. Theeram volunteers patrolled from November to March of each fortnight (during 0600 to 0830 hours) for recording the number of olive ridley sea turtle nesting. The eggs had to

be protected from predators, human and animal. So, freshly laid eggs were carefully dug out from their original nests and re-buried immediately in a make-shift hatchery. After 45-60 days later when the turtle hatchlings struggled to reach the surface, they were gently released back into sea.

## Field method - Theeram Prakriti Samrakshana Samithy in Kolavipalam

The conservative effort was initiated by Mr. Surendra Babu, a local person, realised that the turtles, which arrived at his native village of Kolavipalam every year of the same species. Along with him, few friends decided to conserve olive ridley turtles nesting. A large number of eggs laid by the olive ridley turtles were collected and kept in an artificial hatchery set up by volunteers of Theeram, at Kolavipalam, near Kozhikode. They form "Theeram Prakriti Samrakshana Samithy" turtle hatchery located in Kolavipalam (N 11° 30.897' and E 075° 35.772') with help of state forest department, a movement which has been active for last two decades.

## Results and Discussion

The Kolavipalam sandy beach of about 8 km were surveyed for nesting and hatchling observations

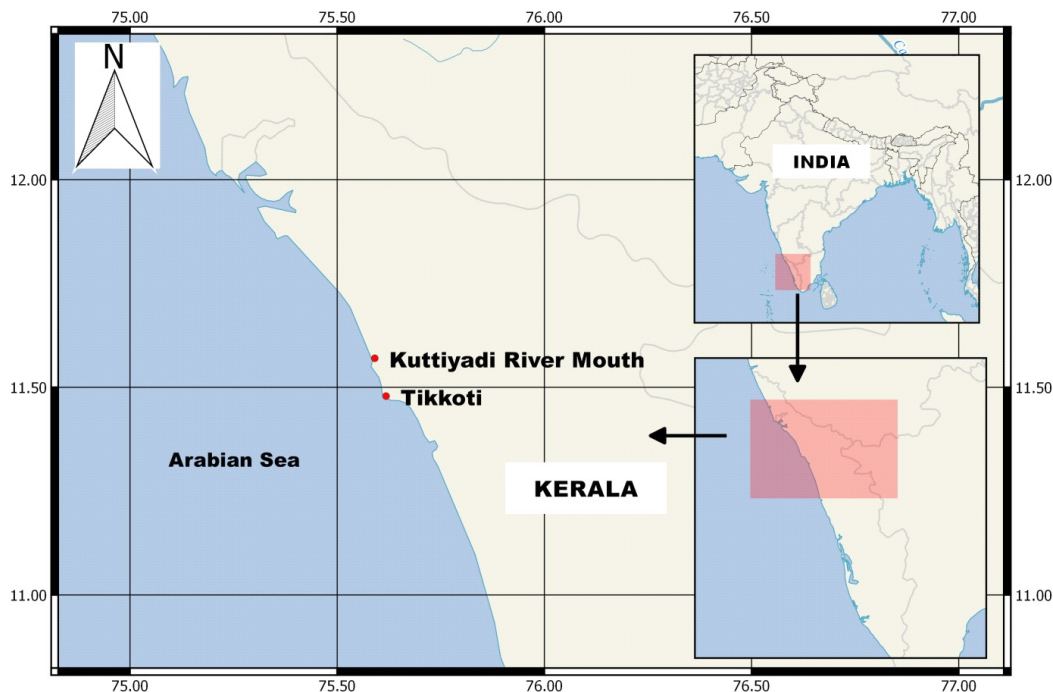
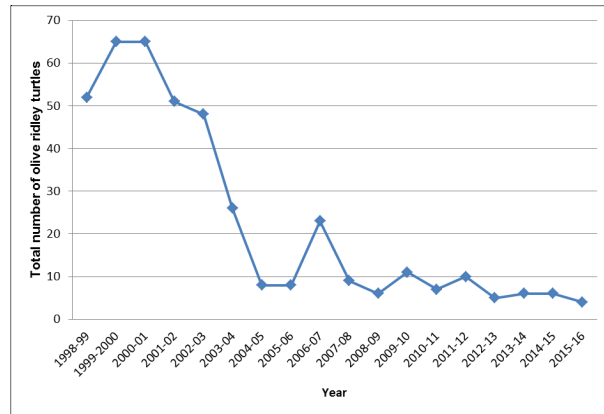


Fig. 1. Map showing olive ridley sea turtle nesting areas between Kuttiyadi river mouth to Tikkoti in North Kerala.

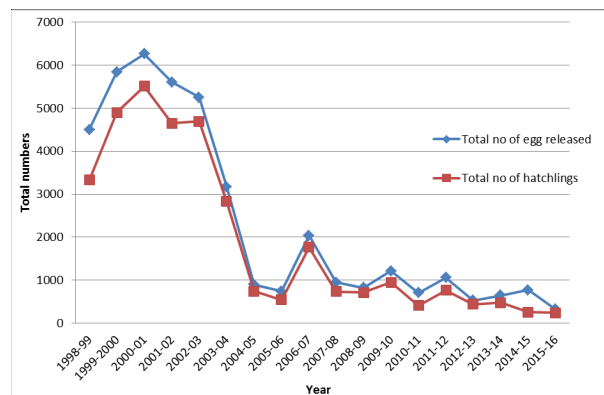
between the month of November to March from 1998-99 to 2015-16.



**Graph 1:** Number of olive ridley turtle nesting recorded in Kolavipalam beach from the year 1998-99 to 2015-16.

It revealed the existence of a sea turtle nesting populations in Kolavipallam beach, North Kerala, India. From the year 1998-99 to 2015-16, a total of 410 olive ridley sea turtle nest were recorded in Kolavipalam beach. The maximum number of turtle nests of 65 nos. recorded in the year of 1999-2000 and 2000-01 continuously. A least number of turtle nests of 04 nos. recorded during 2015-16. The seawall structures along the shore and increased fishing related activities in past few decades along the northern part of Kerala coast could perhaps be the main reasons, and that caused this drastic decline.

The maximum and minimum number of sea turtles egg releasing of 6264, 322 no's recorded during the year 2000-01 and 2015-16 respectively. From 2004-05 onwards the arrival number of olive ridley



**Graph 2:** Total no of olive ridley turtle eggs and hatchlings released in Kolavipalam beach from the year 1998-99 to 2015-16.

sea turtles for nesting in Kolavipalam region declined tremendously. The maximum and minimum number of 5,508 and 237 sea turtles hatchlings released into sea during 2000-01 and 2015-16 respectively. The maximum and minimum percentage of hatchlings of 89.29%, 33% observed in the year of 2002-03 and 2014-15 respectively.

As coastal regions experience sea erosion, various strategies have been used to control the impact of beach loss or storm damage. Hard stabilization measures such as groins, jetties, and seawalls effectively protect property, but tend to result in beach narrowing or loss (Beatley *et al.*, 2002; Bouchard *et al.*, 1998; Fletcher *et al.*, 1997). Sea walls directly threaten to sea turtles by reducing or degrading suitable nesting habitat. They block turtles from reducing the upper portion of the beach, causing turtles to nest in less than optimal nesting areas lower on the beach where their nests are more susceptible to wave action and more likely to be covered with water (Carol and Anne Savage, 2011). Marine turtle populations in Asian water have been depleted through long-term harvests of eggs and adults, and as by-catch of trawl fisheries (Shanker and Pilcher, 2003). Fehmida F. Asrar (1999) stated that beach development, fishing activities, noise from neighbouring villages, pollution from a nearby harbour and exploitation of turtle products attributed towards declining turtle population.



**Fig. 2.** View of seawall structure in Kolavipalam area which affects the turtle nesting sites.

Incidental capture of turtles in fishing gears mainly trawls, gillnets, as well as the ingestion or entanglement in discarded or lost fishing gear causes reduction in sea turtles nesting population (Oravetz, 1999). Sunderraj *et al.*, (2006) reported a significant threat from depredation of nest by animal's mainly feral dogs and from coastal development. From our detailed observation, we con-

clude that seawall structure along the shore that alter turtle nesting area from sandy to rocky, incidental capture of turtle during fishing operation, nest depredation by feral animals has leads to significantly decline olive ridley turtle nesting ground and its population in Kolavipalam, North Kerala, India. More proactive conservation measures are needed to protect sea turtles and rebuild their populations to healthy levels. The olive ridley turtle is included in the "Vulnerable" category of the IUCN Red List

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### References

- Agastheesapillai, A. and Thiagarajan, R. 1979. Biology of the green turtle *Chelonia mydas* (Linnaeus) in the Gulf of Mannar and Palk Bay. *Journal of the Marine Biological Association of India*. 21 (1&2) : 45-60.
- Asrar, F.F. 1999. Decline of marine turtle nesting populations in Pakistan. *Marine Turtle Newsletter*. 83: 13-14.
- Beatley, T., Brower, D.J. and Schwab, A.K. 2002. *An Introduction to Coastal Zone Management*. Washington DC, Island Press. 285.
- Bhupathy, S. and Karunakaran, 2003. Conservation of olive ridley sea turtle *Lepidochelys olivacea* (Reptilia/Chelonia) along the Nagapatnam coast, southeast coast of India. *Indian Journal of Marine Science*. 32(2): 168-171.
- Bhupathy, S. 2007. Monitoring of marine turtles along the Kerala and Tamil Nadu coasts. *Indian Ocean Turtles Newsletter*. 5 : 1-9.
- Bouchard, S., Moran, K., Tiwari, M., Wood, D., Bolten, A., Eliazar, P. and Bjorndal, K. 1998. Effects of exposed pilings on sea turtle nesting activity at Melbourne Beach, Florida. *Journal of Coastal Research*. 14 : 1343-1347.
- Carol E. Rizkalla and Anne Savage, 2011. Impact of Seawalls on Loggerhead Sea Turtle (*Caretta caretta*) Nesting and Hatching Success. *Journal of Coastal Research*. 27(1) : 166-173.
- Fletcher, C.H., Mullane, R.A. and Richmond, B.M. 1997. Beach loss along armored shorelines on Oahu, Hawaiian Islands. *Journal of Coastal Research*. 13(1): 209-215.
- Kar, C.S. and Bhaskar, S. 1982. Status of sea turtles in the Eastern Indian Ocean. In: *Biology and Conservation of sea Turtles* (ES. K.A. Bjorndal). Smithsonian Institution Press, Washington DC. 365-372
- Kurian, A. 2008. *Environmental factors influencing turtle nesting along the Indian coast*. Ph.D Thesis, Karnataka University, Karnataka, India.
- McClenachan, L., Jackson, J.B.C. and Newman, M.N.H. 2006. Conservation implications of historic sea turtle nesting beach loss. *Frontier Ecological Environment*. 4(6): 290-296.
- Meena, R.L., Vyas, J.V. and Jadeja, R.S. 2007. Sea turtle hatcheries in Kachchh, Gujarat. *Indian Ocean Turtles Newsletter*. 5 : 19-20.
- Oravetz, C.A. 1999. Reducing Incidental Catch in Fisheries. Eckert, K.L., Bjorndal, K.A., Abreu-Grobois, F.A. and Donnelly, M. (Editors). *Research and Management Techniques for the Conservation of Sea Turtles*. IUCN/SSC Marine Turtle Specialist Group Publication No. 4.
- Rajagopalan, M., Pillai, E.V.K., Srinath, M. and Fernando, A.B. 1996. Incidental catch of sea turtles in India. *Marine Fisheries Information Services Technical and Extension Series*. 143 : 8-16
- Shanker, K. and Pilcher, N. 2003. Marine Turtle Conservation in South and Southeast Asia: Hopeless cause or Cause for Hope? *Marine Turtle Newsletter*. 100 : 43-51.
- Shanker, K. 2003. Thirty years of sea turtle conservation on the Madras coast: a review. *Kachhapa*. 8: 16
- Silas, E.G., and Rajagopalan, M. 1984. Recovery Programme for olive ridley *Lepidochelys olivacea* (Eschscholtz, 1829) along Madras Coast. *Bulletin of Central Marine Fisheries Research Institute*. 35 : 9-21.
- Silas, E.G., Rajagopalan, M. and Fernando, A. B. 1983. Sea turtles of India - Need for a crash programme on conservation and effective management of the resource, Marine Fisheries Information Service, (Special issue on management and conservation: Sea Turtles). 50 : 1-12.
- Sunderraj S.F.W., Joshua, J., Brahmabhatt, L., Saravanakumar, A., Muthuraman, B. and Das, S.K. 2006. The status of sea turtle populations on the Gujarat coast. In: Towards an integrated and collaborative sea turtle conservation programme in India: a UNEP/CMS-IOSEA Project Report (eds. K. Shanker and H.V. Andrews). Centre for Herpetology /Madras Crocodile Bank Trust, Mamallapuram, Tamil Nadu.
- Tripathy, B., Shanker, K. and Choudhury, B.C. 2006. The status of sea turtles and their habitats in the Lakshadweep archipelago, India. *Journal of the Bombay Natural History Society*. 103 (1) : 33-43.