

## Nesting surveys of olive ridley turtles (*Lepidochelys olivacea*) along the beaches of Sriharikota Island, Andhra Pradesh, India

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### Introduction

A 10 km long beach was surveyed in 2003 and 2006, during the breeding season of January to March, to obtain basic data on sea turtles nesting in Sriharikota and identify conservation issues.

Among the five species of marine turtles found in Indian waters, all except the loggerhead turtle *Caretta caretta* have been reported from the state of Andhra Pradesh (Tripathy *et al.*, 2003). The olive ridley turtle (*Lepidochelys olivacea*) is the most common marine turtle nesting along the Indian coast. The mass nesting beaches of the species in India are at Gahirmatha (>100,000), Devi river mouth and Rushikulya (>10,000 in each site) in Orissa (Tripathy *et al.* 2003; Shanker *et al.*, 2004). The coasts of Andhra Pradesh and Tamil Nadu have been subject to surveys (Bhupathy & Saravanan, 2002; Tripathy *et al.*, 2003) to determine its breeding status along this stretch. However, the stretch of 56 km nesting beach of Sriharikota Island, the spaceport of India, was not covered by these surveys due to the island's protected status. We could partly fill this lacuna due to a 6-year (2001-2007) faunal diversity project funded by the Indian Space Research Organisation (ISRO). During the project, a 10 km long stretch of beach was surveyed during the 2003 and 2006 breeding seasons (January to March) to obtain basic data on sea turtles nesting in Sriharikota and identify the conservation issues facing them.

### Study area

Sriharikota is a spindle shaped island (of area 181 sq. km) situated in Nellore and Tiruvallur districts of

Andhra Pradesh and Tamil Nadu respectively. It is bounded on the east by the Bay of Bengal and on the north, south and west by the waters of Pulicat Lake. The island comprises low ridges of sand, marine and aeolian in origin, rising 4.5 - 6 m and sloping from west to east. The water table is *ca.* 2 to 5 m. Sriharikota has been connected by road to Sullurpet (18 km) on the mainland since 1970. The rainfall is largely from the northeast monsoon (October to December). Some rainfall is also received during the southwest monsoon (June to September). The area is prone to cyclones, usually in the early part of May and October, during the onset of the two monsoons. The annual rainfall is *ca.* 1,200 mm. December to February is the winter season, with temperatures as low as 10°C. March to September is the summer season with temperatures rising over 40°C. Relative humidity is lowest during May (18%), while the maximum (99%) is recorded during October (Suryanarayana *et al.*, 1998; Sivakumar & Manakadan, 2004).

The island was taken over by the Indian Space Research Organisation (ISRO) between 1969 and 1972 to set up India's spaceport, now called the Satish Dhawan Space Centre (SDSC), and the island is a high-security zone. The SDSC has a Conservation and Landscape Division (C&LD) for the conservation and management of forests. Sriharikota Island is important from the biodiversity point of view as it has the last remaining, largest and best-preserved tracts of coastal tropical dry evergreen forest left in India.

### Methods

A team of three persons carried out the surveys during the 2003 and 2006 breeding seasons each

year between January and March. The area covered was a 10 km stretch of beach from the northern tip of Sriharikota to the mouth of the Pedda Wagu. This stretch was divided into 5 km long segments. One 5 km stretch was surveyed per day, and the total of 10 km was surveyed over two days every month. In March 2006, the entire transect was covered three times, i.e., over a period of six days. The team surveyed each segment early in the morning. The entire transect was covered at least once in a month. Nests were located by looking for tracks of turtles on the beach leading to the nest or by looking for exposed nests that had been predated/collected by animals/humans. On location of nests, site details such as distance of the nest from water and the forest edge, presence/absence of vegetation at the nest site, status of nest, etc. were collected. Dead turtles found on the beach were also recorded during these searches. The carapace and tracks of the turtles were investigated to identify the species (Shanker *et al.*, 2003).

## Results

A total of 27 nests and 60 nests of olive ridley turtles were recorded during the 2003 and 2006 breeding seasons respectively. Of these, only two nests were found intact each year, the rest were predated either by jackals or wild boar (52% in 2003 and 75% in 2006) or collected by people (41% in 2003 and 22% in 2006). In addition, complete carapaces of 22 and 36 adults were found in 2003 and 2006 respectively.

The average distance of nests from the low tide line was 14.9 m ( $\pm$  8.06 m) and from the high tide line was 8.1 m ( $\pm$  7.03 m). Almost 52% of the nests were within 10 m or less from high tide line; 25% were between 11 - 20 m, five percent of the nests were between 21 - 30 m, and the rest were within the high tide line. Nests were 36.2 m ( $\pm$  16.5 m) away from scrub forest or *Casuarina* plantations that border the beaches. Out of 87 nest sites, 75 sites were bordered by *Casuarina* plantations. The average distance between nests and *Casuarina* plantations was 51.9 m ( $\pm$  24.2 m; n = 22). Shoreline vegetation such as *Spinifex littoreus* and *Ipomoea pescarpae* were found in 22 nest sites; four nests had these sand dune species 2 m away; and the rest (n = 61) did not have any vegetation around them.

## Discussion

From the data collected and accounts of the local tribal Yanadis, it appears that the Sriharikota beach is a regular breeding site of olive ridleys, with probably about 500 nests each year. From the data gathered and accounts of tribals, it seems that only the olive ridley turtles nest in Sriharikota. As for the numbers of olive ridleys nesting, if the records obtained in the 10 km stretch are extrapolated for the c. 50 km, these would work out to 135 and 300 turtles during 2003 and 2006 respectively. Tripathy *et al.* (2003) recorded 274 nests from Sriharikota in a 15 km long stretch between January and March 2001. However, according to ISRO, no such study was carried out in the island, and what is referred to as Sriharikota is probably the stretch of land immediately north of the island.

In 2003, the surveys were carried out for two days in January and two days in February. Surveys in each month resulted in records of 13 and 14 nests respectively. Surveys were carried out for two days each in January and February and six days in March during 2006. There was no record of nests during the surveys in January 2006, although there were records of dead turtles. Fourteen nests were recorded in February and 46 nests in March 2006. From this, it appears that most of the turtles nest between mid-January and mid-March in Sriharikota, as reported in other adjacent areas (Shanker, 1995; Tripathy *et al.*, 2003). According to local tribals, nests may be found till May.

More than 70% of the nests were recorded in the northern stretch during both the years. This stretch has the mouths of the Vepenjeri Canal (contiguous with Pulicat Lake), Mavalam or Malliplatte Vagu (a perennial stream of Sriharikota Island) and Sudaneri Odappa (a monsoonal stream of Sriharikota Island). Beaches adjacent to river mouths are preferred nesting sites of the olive ridley turtle (Tripathy *et al.*, 2003).

The conservation issues facing olive ridley turtles in Sriharikota are:

*Nest predation:* Seventy percent of the clutches recorded during the survey were preyed upon either

by wild boar (*Sus scrofa*) or golden jackal (*Canis aureus*), which are common on the island. The tribal Yanadis poached 28% of the nests.

*Mortality of adult turtles:* From interactions with the Yanadis, we learnt that there is occasional slaughter of marine turtles on the island. As many as 22 dead turtles were noticed during the beach surveys.

*Plantations:* In many areas, the tall *Casuarina* plantations occupy almost the entire area of the beach. Besides occupying nesting areas and the potential impacts of shading on sex ratios, these plantations offer shelter for mammalian predators.

*Illumination:* Some stretches of the beach have illuminated roads and buildings, and the lights could disorient hatchlings.

## Recommendations

Since Sriharikota is a high-security zone, it can serve as an ideal refuge for nesting sea turtles with basic conservation initiatives. The main problems facing

sea turtles are egg predation by jackal and wild boar, egg collection by tribals, encroachment of beaches by *Casuarina* plantations, lighting at some parts of the coast, and trawling along the coast. An awareness programme for the tribal community, by engaging them in monitoring programmes during the breeding season, may reduce egg collection. The tribals could also be involved in collection and guarding of eggs in predator proof fenced areas. Implementation of guidelines for coastal illumination given in Choudhury *et al.* (2003) need to be adopted to prevent mortality among hatchlings. Care should be taken to leave enough area for breeding turtles while establishing *Casuarina* plantations to serve as shelter belts. According to Choudhury *et al.* (2003), *Casuarina* plantations should be established at a minimum distance of 200 m from the high tide line in turtle nesting areas.

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## Literature cited:

Bhupathy, S. & S. Saravanan. 2002. Status of sea turtles along the Tamil Nadu coast. *Kachhapa* 7: 7–13.

Choudhury, B.C., B. Pandav, B. Tripathy & H.V. Andrews. 2003. *Sea turtle conservation: Eco (turtle) friendly coastal development*. A GOI-UNDP Project Manual. Madras Crocodile Bank Trust, Mamallapuram, Tamil Nadu, India.

Shanker, K., B. Pandav & B.C. Choudhury. 2003. *Sea turtle conservation: Population census and monitoring*. A GOI-UNDP Project Manual. Madras Crocodile Bank Trust, Mamallapuram, Tamil Nadu, India.

Shanker, K., B. Pandav & B.C. Choudhury. 2004. An assessment of the olive ridley (*Lepidochelys olivacea*)

nesting population in Orissa, India. *Biological Conservation* 115: 149–160.

Sivakumar, S & R. Manakadan. 2004. An ecological account of the faunal diversity of Sriharikota Island and its environs. Final Report: Part II - Herpetofauna. Bombay Natural History Society, Mumbai.

Suryanarayana, B., A.S. Rao, A.M. Rao & V. Veeraraju. 1998. *Flora of Sriharikota Island*. Indian Space Research Organisation, Bangalore.

Tripathy, B., K. Shanker & B.C. Choudhury. 2003. Important nesting habitats of olive ridley turtles *Lepidochelys olivacea* along the Andhra Pradesh coast of eastern India. *Oryx* 37(4): 454–463.