

SILAS, E.G. (1984a) In: E.G. Silas (Eds.). Proceedings of the workshop on sea turtle conservation. *Central Marine Fisheries Research Institute, Special Publication # 18*. Cochin.

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### Beach Armouring in Lakshadweep



## Status of Sea Turtles along the Tamil Nadu Coast, India

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### Introduction

All five species of sea turtles, leatherback (*Dermochelys coriacea*), olive ridley (*Lepidochelys olivacea*), loggerhead (*Caretta caretta*), hawksbill (*Eretmochelys imbricata*) and green turtle (*Chelonia mydas*), found within Indian limits are reported along the Tamil Nadu coast (Kar and Bhaskar 1982). Barring the loggerhead, all the other species are reported to nest along the coast of this state. Several institutions such as the State Forest Department, Central Marine Fisheries Research Institute (CMFRI), Madras Snake Park Trust (MSPT) and Student's Sea Turtle Conservation Network (SSTCN) have been involved in sea turtle conservation in this part of the country (Valliappan and Whitaker 1974, Whitaker 1977, Agastheesapillai and Thiagarajan 1979, Bhaskar 1981, Silas and Rajagopalan 1984, Shanker 1995, Rajagopalan *et al.*

1996). The Chennai (Madras) coast is being monitored annually by SSTCN since 1988 (K. Shanker, pers. comm.).

Sea turtles are reportedly declining all over the world due to habitat loss, mortality due to unscientific fishing practices and exploitation for food (Limpus 1995). Mortality of thousands of olive ridleys has been reported in the mass nesting areas due to incidental catch in the fishing gear (Pandav *et al.* 1998). Mortality in the breeding ground will lead to severe population decline as matured individuals are eliminated forever. Also, sea turtles require several years to attain sexual maturity. In addition, they are also exploited by humans for meat and eggs all over their range. Available information on the sea turtles along the entire coast of the country is largely anecdotal, and is restricted with respect to area or time. In this background, the Ministry of

Environment and Forests, Government of India initiated the GOI-UNDP-WII Sea Turtle Conservation Project covering all maritime states of the country to determine the status of sea turtles along the entire coastline. As a part of this project, the Salim Ali Centre for Ornithology and Natural History (SACON) has conducted field surveys along the Tamil Nadu coast from November 2000 to May 2001. In the present paper we report the status of sea turtles along the Tamil Nadu coast, and propose measures for conserving them.

### **Field methods**

- Tamil Nadu, with 980 km coastline has both east (900 km) and west (80 km) coasts (Fig 1). Methods followed for data collection are given below.
- A preliminary survey was conducted along the entire Tamil Nadu coast during November-December 2000 recording coastline characteristics such as sand, rock, mangrove and swamp at every 10-15 km. Sandy beaches were considered suitable for sea turtle nesting, and rock, swamps and development activities as unsuitable for the same.
- Based on the preliminary surveys, locations for intensive studies were short-listed. Fortnightly monitoring of beaches during the olive ridley nesting season (December-April) were done along the Nagapattinam, Rameswaram and Tiruchendur - Kanniyakumari coasts.

- In addition, a co-ordinated survey was done from January 20 to February 20, 2001 covering most parts of the Tamil Nadu coast to assess the overall sea turtle nesting.
- Field survey started at 0500 hrs continued up to 0800 hrs. On an average, 10 km was covered in a day. Information on the nest predation, mortality of turtles and reasons for the death were recorded. Select village markets were monitored to quantify exploitation of sea turtles by local people.

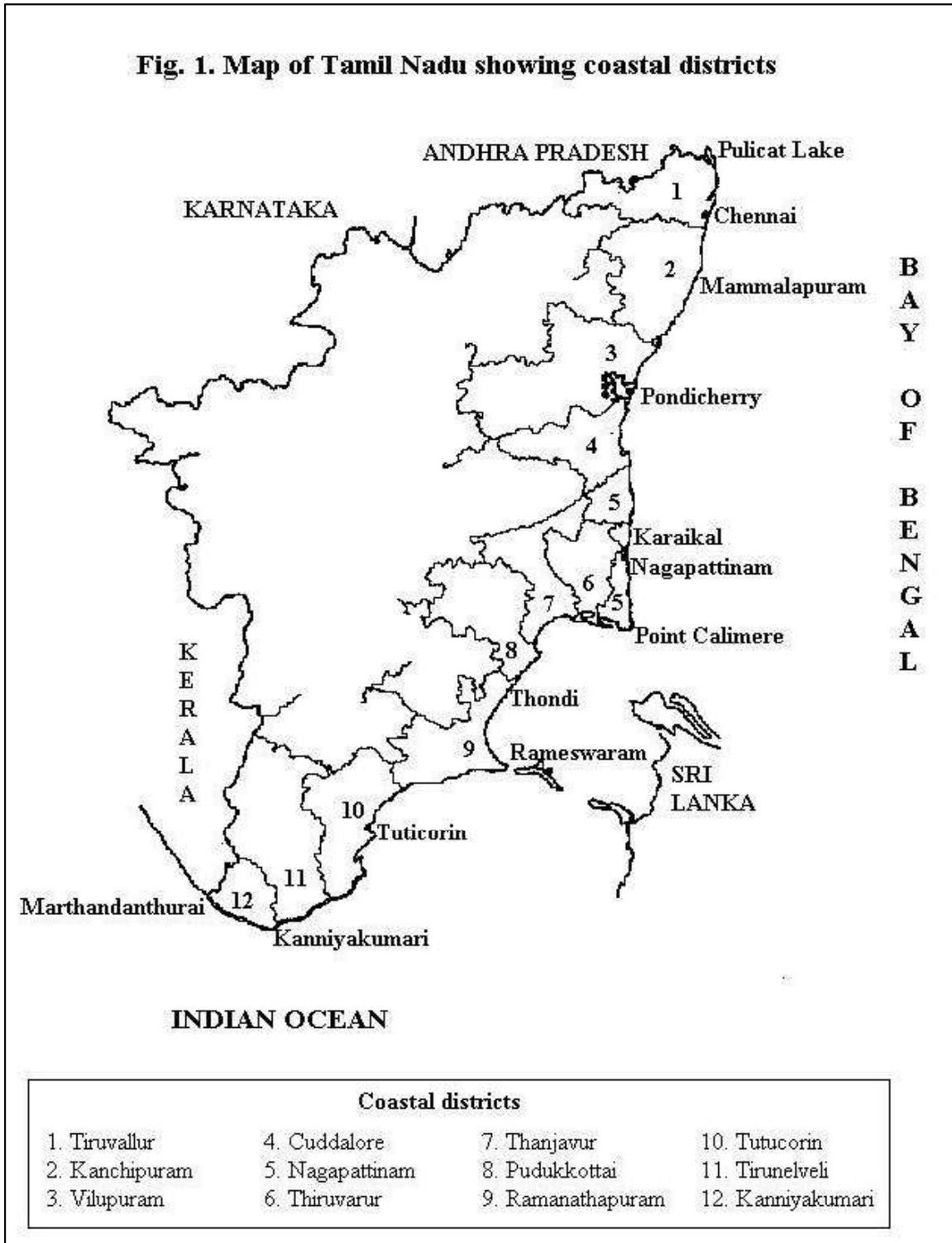
### **Results and discussion**

**Status of Tamil Nadu coast** - Of the 980 km shore, about 821 km was surveyed during the preliminary study which include 79 localities. About 530 km (65%) of the coast had sandy beaches, and are assumed to be suitable for sea turtle nesting (Table 1). Human habitations and related development activities, and rock and swamps occupied the remaining portion of the coast. Even though a majority of the west coast and east coast along Kanniyakumari-Tiruchendur were sandy, the area was highly disturbed due to sand mining. Sea walls built to protect the land from sea erosion provided no space for nesting in parts of the west coast. Also, the interface between the sea and human habitation was minimal (<5 m) in parts of this sector.

**Table 1.** Beach characteristics of Tamil Nadu with reference to sea turtle nesting

Coastal sector	Sampled (km)	Nesting suitability		Unsuitable beach for nesting		
		Suitable	Unsuitable	Rocky	Development	Swamp
West Coast	63	50	13	10	3	0
Kanniyakumari- Tiruchendur	78	72	6	4	2	0
Tiruchendur- Tuticorin	41	30	11	0	11	0
Tuticorin- Mandapam	114	102	12	12	0	0
Rameswaram Island	38	15	23	8	15	0
Mandapam- Thondi	69	36	33	0	0	33
Thondi-Athirampatinam	80	15	65	0	5	60
Athirampatinam- Nagapatinam	107	44	63	0	13	50
Nagapatinam-Cuddalore	90	60	30	1	14	15
Pondicherry - Chennai	141	110	31	1	30	0
<b>Total</b>	<b>821</b>	<b>534</b>	<b>287</b>	<b>36</b>	<b>93</b>	<b>158</b>

**Fig. 1. Map of Tamil Nadu showing coastal districts**



**Composition of turtles** - The composition and abundance of turtles were based on number of nests, dead turtles observed on the beach, and in select village markets. Totally, 516 observations of five species were made during this study. The most common species was the olive ridley followed by the green turtle. The turtle composition of the Gulf of Mannar and Nagapattinam was different. Along the coast of Nagapattinam, olive ridleys and green turtles were observed, of which the former constituted 98.1%. In the Gulf of Mannar, olive ridleys (59.6%) and green turtles (35.2%) together constituted 94.8%, while the other three species were rare and constituted only 5.2% of the total.

**Nesting** - The olive ridley does not show any pattern with respect to their arrival and departure for nesting along the Kanniyakumari coast and Gulf of Mannar. However, along the Nagapattinam coast, turtles emerged for nesting during the second half of December and continued up to first half of April with the peak during the second half of February

(Table 2). An estimated 1080 nests (22/ km) were seen in the 50 km of this coast (Table 2). In other areas, such as Rameswaram and Kudankulam-Tiruchendur (Gulf of Mannar), it was about 1 and 3 nests/km respectively. It appears that the Gulf of Mannar is largely a feeding ground for turtles rather than a nesting area.

Co-ordinated sampling along the entire coast during 20 January – 20 February 2001 showed that turtles nested comparatively higher north of Point Calimere up to Chennai. The estimated frequency of nesting in this sector varied from 0 to 11 nests /km (Table 3). Important areas of turtle nesting are coastline between Tranquebar – Pazhaiyar (Nagapattinam district) and Pondicherry – Chennai.

Both rapid and intensive surveys showed that the nesting of olive ridleys along the Tamil Nadu coast is sporadic, and the estimated number of nests is 2500-4000/ season.

**Table 2.** Fortnightly nesting of the olive ridley along select sectors of Tamil Nadu

Month & Fortnight	Nagapattinam (50 km)		Rameswaram (15 km)		Kanniyakumari-Tiruchendur (70 km)	
	Nest	Nest/day/10 km	Nest	Nest/day/10 km	Nest	Nest/day/ 10 km
December I	1	0.2	0	0	0	0
December II	3	0.6	0	0	4	0.6
January I	1	0.2	1	0.5	1	0.1
January II	6	1.2	0	0	0	0
February I	3	0.6	0	0	4	0.6
February II	28	5.6	0	0	4	0.6
March I	14	2.8	0	0	1	0.1
March II	15	3	0	0	0	0
April I	1	0.2	0	0	0	0
April II	0	0	0	0	0	0
<b>Total</b>	<b>72</b>	<b>14.4</b>	<b>1</b>	<b>0.5</b>	<b>14</b>	<b>2</b>
Estimated nest	1080		11		210	
Nest/km	22.6		1.0		3.0	

**Table 3.** Sea turtle nesting along various sectors of the Tamil Nadu during January-February 2001; Distance sampled per day=10 km, Higher nesting was assumed to occur for 30 days during the peak season

Coastal sector	Distance (Km)	Survey days	Nests	Nests/ night/ 10 km	Estimated nest/ 30 days	Nest/ km
Kanniyakumari-Thiruchendur	80	8	4	0.5	120	1.5
Thiruchendur- Mandapam	60	6	1	0.17	30	0.50
Rameswaram	15	1.5	1	0.67	30	2
Mandapam- Thondi	30	3	0	0	0	0
Point Calimere-Nagapattinam	30	3	4	1.33	120	4
Tranquebar-Pazhaiyar	50	5	18	3.6	540	11
Pondi-Mamallapuram	60	6	7	1.17	210	3.5
Mamallapuram-Chennai	40	4	13	3.25	390	9.8
<b>Total</b>	<b>365</b>	<b>36.5</b>	<b>48</b>	<b>10.69</b>	<b>1440</b>	

Overall nesting intensity in the sampled areas = 4/km

Nest estimate for all over Tamil Nadu coast (980 km) = 3920 nests

Nest estimate for suitable nesting area (637 km or 65%) = 2548 nests

**Mortality** - A total of 462 dead turtles was observed during this study. Higher number of dead turtles were observed along the Nagapattinam coast (4.5 turtles/ km). Rapid surveys showed that turtle mortality was also high along the Chennai and Pazhayar coasts (Table 4). Incidental catch in the

fishing nets and mechanical injury and exploitation for food are major reasons for turtle mortality. The incidental catch in the fishing gears is wide spread along the Tamil Nadu coast, whereas the exploitation is restricted to the southern parts.

**Table 4.** Mortality of turtles along select coastline sectors of Tamil Nadu from November 2000 to April 2001

Species	Kanniyakumari-Tuticorin	Mandapam	Nagapattinam	Chennai*	Total
<b>Olive ridley</b>	64 (59)	36 (6)	239	38	377
<b>Loggerhead</b>	0	4 (2)	0	0	4
<b>Green turtle</b>	55 (52)	13 (3)	6	0	74
<b>Hawksbill</b>	2 (2)	2 (0)	0	1	5
<b>Leatherback</b>	1 (1)	1 (0)	0	0	2
<b>Total</b>	122 (114)	56 (11)	245	39	462

\* one survey only; No. in paranthesis is number of turtles exploited by locals

**Incidental catch** - Gill nets are widely used for marine fishing along the Tamil Nadu coast. Of the 245 dead turtles found on Nagapattinam coast, 94 were fresh. Among them, 66 had visible injuries. The head or one of the flippers was missing in eight of them. When turtles get entangled in fishing nets and are found alive, the fishermen chop off their flippers or club the head to remove them from net without damaging the net or themselves. This is common along the Nagapattinam and Chennai coasts. In the southern parts, live turtles are

collected and consumed, and dead turtles discarded in the sea. A higher number of fishing vessels operate in south Tamil Nadu compared to the northern parts i.e. Nagapattinam coast. However, the registered number of vessels are very low compared to the number seen in the field (Table 5). For instance, according to the Fisheries department, there are 1278 fishing vessels registered in the Nagapattinam district. However, interviews and counting in 11 villages show at least 2110 vessels.

**Table 5.** Statistics of fishing gears in major coastal districts of Tamil Nadu

<b>Statistics</b>	<b>Tuticorin</b>	<b>Ramanathapuram</b>	<b>Nagapattinam</b>
Mehanised boat	361	5973	1278 (2110)
Non- mehanised boat	2617	786	-
No. of Catamaran	1516	-	-
Number of fishing villages	25	149	42
Vessels/fishing village	180	46	30 (192)

Source: Tamil Nadu Fisheries Department; No. in parenthesis is figures obtained based on counts in 11 coastal villages in Nagapattinam district.

**Exploitation** - The present study showed that turtles were regularly exploited for food along the southern districts especially south of Tuticorin (Table 4). Mandapam is a part of the Gulf of Mannar Biosphere Reserve, and the presence of field staff of the wildlife wing of the Tamil Nadu Forest Department deterred the fishermen from catching turtles. The locals of this area are aware of the Wild Life (Protection Act) 1972, and punishment for hunting wildlife, especially sea turtles. The olive ridley and green turtles were commonly exploited species. Barring protected areas such as Point Calimere Wildlife Sanctuary and Gulf of Mannar Biosphere Reserve, turtle eggs were collected from all over the Tamil Nadu coast. Eggs are consumed by the locals, and about 95.4% (n=87) of depredated nests were stolen by human.

**Olive ridley migration** - The Wildlife Institute of India (WII), Dehradun had marked about 6800 turtles with monel metal tags along the Gahirmatha, Rushikulya and Devi coasts, Orissa during 1997-99. Two tags were recovered from Kanniyakumari area, the southern tip of the Indian peninsula. The turtle bearing tag WR 26135 was a female and was tagged during the nesting in Rushikulya rookery on 22.03.1998 (Pandav, pers. comm.). The fishermen near Kanniyakumari collected the tag from a dead turtle during mid June 2000 while fishing in the Indian Ocean near their village. This recovery is during the non-breeding season, 27 months after it was tagged at Rushikulya, Orissa. The turtle bearing tag WG 14805, also a female, was marked on 6.1.1999 near Gahirmatha while mating (Pandav, pers. comm.). This and five more turtles were found dead in a gill net during mid November 2000 north of Kanniyakumari (in Bay of Bengal). This tag recovery coincided with the beginning of migration

to the nesting ground. This recovery is about 22 months after it was marked at Gahirmatha. These recoveries confirm the migration of olive ridley from the southern Bay of Bengal and Indian Ocean to the Orissa coast for nesting.

#### **Suggestions for sea turtle conservation**

Important measures for sea turtle conservation in Tamil Nadu are given below.

- Subsistence exploitation of sea turtles exists in the southern districts. Exploitation control is suggested as the Gulf of Mannar forms a part of the foraging and nursery ground for turtles, and exploitation in this area would have serious impact on the long term survival of turtles. Intensive beach patrolling by the Forest Department during February and March may reduce egg poaching, and would help in recruitment.
- Live turtles entangled in the fishing nets are beaten (to death?) especially along the Nagapattinam-Chennai coast. Awareness programmes to obtain voluntary support from the local fishing communities for the safe release of turtles and protection of eggs is necessary. This programme should include demonstration of appropriate techniques for removing entangled turtles.
- Regular monitoring and tagging of sea turtles in the Gulf of Mannar, Nagapattinam and Chennai coast would provide further insights on the migration of olive ridleys. Information on the trend in population, nesting intensity and poaching are also important for planning

conservation measures.

- Development of resource personnel is important for long term conservation of a species or ecosystem. Training programmes and workshops may be organised especially for the benefit of field officers of the Forest and Fisheries Departments. Resource persons may also be developed at local levels involving stake holders such as government departments, fishing community, students and research organisations.

Tamil Nadu should be given higher priority in sea turtle conservation programmes as it harbours all

### References

AGASTHEESAPILLAI, A. & R. THIAGARAJAN (1979). Biology of the green turtle *Chelonia mydas* (Linnaeus) in the Gulf of Mannar and Palk Bay. *J. mar. biol. Ass. India* 21 (1&2): 45-60.

BHASKAR, S. (1981). Sea turtle survey of southern Tamil Nadu. Report to the World Wide Fund - India.

KAR, C.S. & S. BHASKAR (1982). Status of sea turtles in the Eastern Indian Ocean. In: Biology and conservation of sea turtles. K.A. Bjorndal (ed). Smithsonian Institution Press, Washington D.C.: 356-372.

LIMPUS, C. J. (1995). Global overview of the status of marine turtles: A 1995 viewpoint, in: *Biology and conservation of sea turtles*. K.A. Bjorndal (ed). Smithsonian Institution Press, Washington DC: 605-609.

PANDAV, B., B.C. CHOUDHURY & K. SHANKER (1998). The olive ridley sea turtle (*Lepidochelys olivacea*) in Orissa: An urgent call

five species, and holds both breeding and foraging areas of major turtle species.

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for an intensive and integrated conservation programme. *Current Science* 75 (12) : 1323 - 1328.

RAJAGOPALAN, M., S. VIVEKANANDAN, S. KRISHNA PILLAI, M.SRINATH & A. B. FERNANDO (1996). Incidental catch of sea turtles in India. *Mar. Fish. Info. Ser.* 8-15.

SHANKER, K. (1995). Conservation of sea turtles on the Madras coast. *Marine Turtle Newsletter* 64:3-6.

SILAS, E.G. & M. RAJAGOPALAN (1984). Recovery Programme for olive ridley *Lepidochelys olivacea* (Eschscholtz, 1829) along the Madras coast. *Bull. Cent. mar. fish. Res. Inst.* 35: 9-21.

VALLIAPPAN, S. & R. WHITAKER (1974). Olive ridleys on the Coromandel coast. Madras Snake Park Trust, Madras. 10p.

WHITAKER, R. (1977). A note on sea turtles of Madras. *Indian Forester* 103(11): 733-734.