

We know keeping hatchlings for a day or two in tanks robs them of their natural inclination to swim offshore, yet the hatchery continues to do so. In other cases it concerns the use of metal enclosures: we know metal cages confuse hatchlings, yet many hatcheries continue to employ them. Let's all

understand these failings, and be more proactive about using the knowledge that we possess, be it traditional, technical or scientific for the better common goal, and let's see a reversal in the decline of today's sea turtle populations in our present lifetime.

## Marine Turtles Of Lakshadweep Islands, India

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### Introduction

Five of the seven species of sea turtles viz. olive ridley (*Lepidochelys olivacea*), green turtle (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), leatherback turtle (*Dermochelys coriacea*) and loggerhead turtle (*Caretta caretta*) are reported to occur in Indian waters (Kar & Bhaskar, 1982). The first survey of sea turtles in Lakshadweep was conducted during 1976 (Bhaskar 1978a&b, 1979a&b). Besides, Central Marine Fisheries Research Institute records (Silas 1984a&b, Lal Mohan 1989) indicate that these four species of sea turtles occur and nest in the Lakshadweep Islands. While Satish Bhaskar worked extensively on green turtle nesting in Suheli Valiakara, a seasonally inhabited island, during the monsoon (Bhaskar, 1979 a&b, 1980), the information available from other islands on sea turtle nesting is very limited and no detailed work has yet been done in any of the islands of Lakshadweep.

The Lakshadweep, Maldives and Chagos Archipelagoes are located on the 2500 km long North-South aligned Maldives Ridge (Chagos-Laccadive Plateau). There is a possibility of migration of sea turtles between Laccadive, Maldives and Chagos Archipelago. Hawksbill and green turtles are also found to the southwest in Seychelles and Madagascar midway between the African coast and west coast of India, and there may be a significant migration and exchange of sea turtle populations in the western Indian Ocean. With this background, the Wildlife Institute of India conducted the survey of the islands from July 2001 to May 2002, under the GOI –UNDP Project.

### Study area

The Lakshadweep Islands are irregularly scattered in the Arabian Sea between 8° to 12° 30' north latitude and between 71° to 74° east longitudes. There are 36 islands (see map) including 12 tolls, 3 reefs and 5 submerged banks covering an area of 32 km<sup>2</sup> land, 4200 km<sup>2</sup> of lagoon and 40,000 km<sup>2</sup> of oceanic zone. Among the 36 islands, only 10 are inhabited and the rest are seasonally inhabited or uninhabited islands (Anonymous, 2000). At present, except Pitti island, no other area of Lakshadweep is protected by law.

### Methods

**Secondary sources of information:** Extensive interviews with islanders, fishermen and officials from the Forest and Fisheries Departments were carried out in all the inhabited islands. A total of 300 persons were interviewed in the islands of which 37 % were islanders, 36 % were seagoing fishermen and 27 % were others. A standard questionnaire (Schroeder & Murphy, 1999) was followed. During the interview, they were primarily asked about the species of turtles that occur and nest in their islands, season of nesting, threats to sea turtles and turtle byproducts used in the islands.

**Survey of turtle abundance and foraging habitat:** The distribution of turtles in foraging areas was determined by offshore surveys of lagoons and nearshore waters by a country craft and by snorkeling. Turtles of different species were recorded while foraging, resting and swimming in the water. The presence or absence of seagrass in the lagoon waters was also documented for

assessment of the habitat availability and habitat preference by green turtles. A total of nine island lagoons were surveyed by snorkeling and ocular observation from a boat.

**Survey of nesting beaches:** The direct ground survey of all islands of Lakshadweep was conducted from August 2001 to February 2002. All the island beaches were covered by foot several times during the survey period. Nesting was confirmed from crawl marks, nesting pits, eggs, live/dead hatchlings and carcasses & other remains of turtle (shells & carapace) washed ashore. Selected nesting beaches were monitored during night to witness species of turtles nesting in the islands. The presence/absence of habitation, beach vegetation, beach substratum and beach armoring and other developmental activities and their levels of impact on the nesting beach were determined for assessment of threats to turtles and nesting beaches in Lakshadweep

### **Results & Discussion**

**Secondary sources of information** - Although there is some confusion in identifying olive ridleys and green turtles by the islanders, the other two species viz. leatherback and hawksbill are clearly recognized in Lakshadweep. It was found from interviews that nesting beaches in Lakshadweep were dominated by the green turtles, followed by olive ridleys and hawksbill turtles. However, the nesting season of each species could not be ascertained from such interviews. Most interviewees in Agatti island felt that green turtles occur in the lagoon throughout the year whereas hawksbills are commonly seen during pre-monsoon and olive ridleys after December and rarely after April.

**Survey of turtle abundance in the lagoon** - Different size classes of green and hawksbill turtles are often caught in gillnets during lagoon fishing. During the survey, juvenile, sub-adult and adult green and hawksbill turtles were caught in gillnet during fishing in the lagoons of Agatti, Kavaratti and Minicoy. Most of the juvenile, sub-adult and adult turtles (green & hawksbill) were observed in the deeper part of the lagoon and outside the reef between the depths of 2-5mts. Green turtles were the most abundant species and olive ridleys were observed only occasionally outside the reef or in the lagoon. Among the different islands, Agatti had the maximum number of green turtles in the lagoon followed by Minicoy and Kadmat.

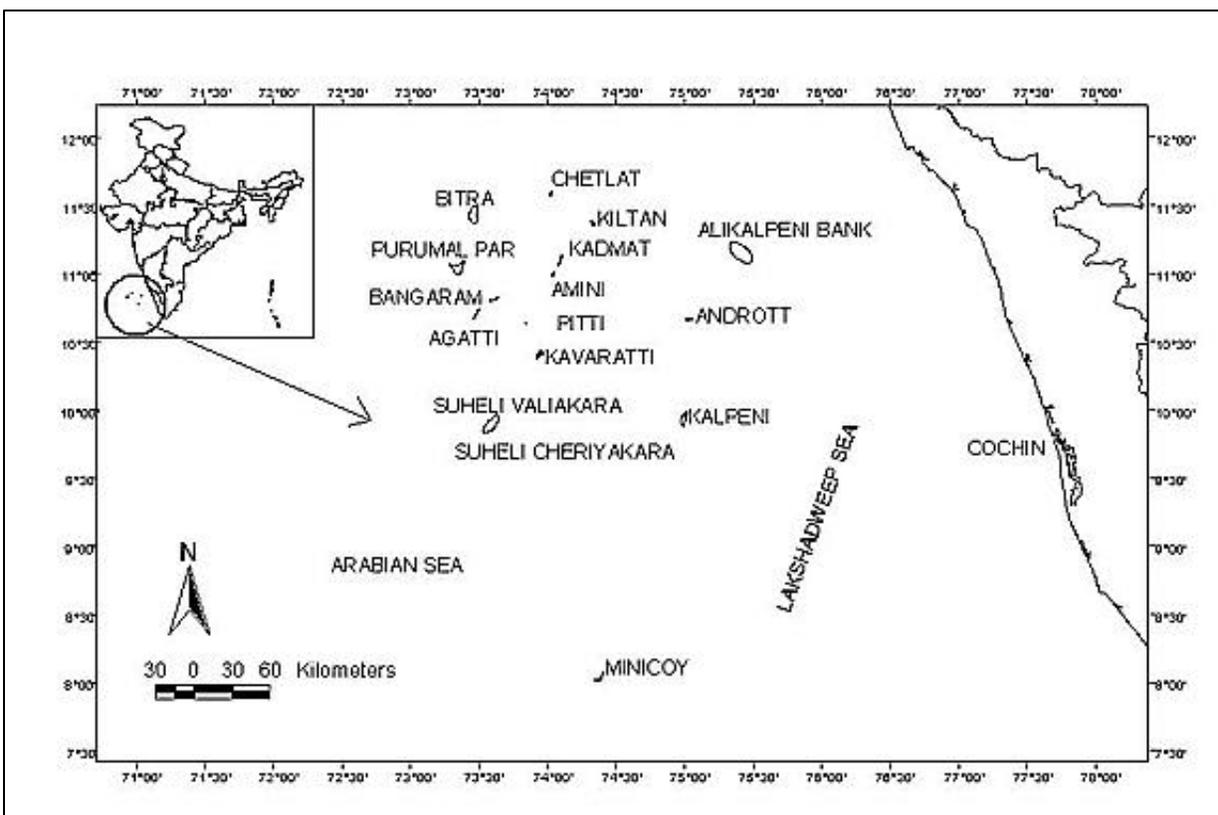
**Survey of foraging habitat** - A total of 9 island lagoons were surveyed for foraging habitat analysis. The maximum seagrass coverage in the lagoon was observed in Minicoy (55.5%) and Kadmat (52%) lagoon. However, in terms of turtle abundance, the Agatti island had the maximum foraging turtles in the lagoon. Therefore, no definite correlation could be established between presence of seagrass and foraging of turtles in the lagoon, but this needs to be more carefully studied.

**Survey of nesting beaches** - Approximately 130 km of coastline was surveyed in the entire island group of Lakshadweep. All sandy beaches available, mostly with vegetation were found to be suitable areas for sea turtle nesting. All the beaches where turtle nesting was observed were narrow (5-10 m) with dense beach vegetation of *Scaevola sericea*, *Thespesia spp.* and *Pemphis acidula* shrubs in the background. During the survey, nesting of three species was documented (Table 1). The number of nests estimated included old and new nests and live nesting observed. Among the three species viz. green, olive ridley and hawksbill turtles, the green turtle was the dominant species in all islands. However, the maximum number of green turtle nests were observed in Suheli Valiakara followed by Tinnakara and Parali I islands, all of which are uninhabited islands.

**Threats to sea turtles** - Carapaces of green turtle were found in uninhabited/seasonally inhabited islands viz. Tinnakara, Parali I & II, Suheli Valiakara and Cheriya island. According to fishermen, green turtles are generally caught during nesting and slaughtered for extraction of oil, which is used for painting country boats as this works as an excellent waterproofing agent. Many people differentiate green and olive ridley turtles by the quality and quantity of oil and the former is preferred because of its oil content. There is no consumption of turtle meat and eggs due to Islamic religious taboo. However, the stuffing of juvenile hawksbill turtles is still in practice in many islands. The stuffed specimens fetch about Rs. 500/- to Rs. 1500/- and are sold to tourists or in the mainland at Mangalore, Calicut or Cochin. There is no incidental fishing related mortality in Lakshadweep, as the fishing method is very different from the mainland coast. The only method used for tuna fishing is pole and line, which pose no threat to sea turtles.

**Table 1.** Sea turtle nesting in different islands of Lakshadweep (2002)

Name of the island	Area (km <sup>2</sup> )	No. of nests encountered		
		Green turtle	Olive ridley	Hawksbill turtle
Kavaratti	4.22	2	3	-
Agatti	3.84	80	16	6
Kalpitti	0.02	4	-	-
Kiltan	1.63	3	-	-
Chetlat	1.14	7	-	-
Bitra	0.1	6	-	-
Andrott	4.84	2	6	-
Kalpeni	2.79	4	6	-
Kadmat	3.12	11	6	-
Amini	2.59	8	-	-
Minicoy	4.39	10	2	-
Suheli Valiakara	0.29	358	-	7
Karingikuppu	0.02	5	48	-
Suheli Cheriyakara	0.28	4	-	-
Tinnakara	0.42	54	-	-
Parali I	0.02	38	-	-
Parali II	0.02	18	-	-
Bangaram	0.58	6	2	2
Viringili	0.02	2	-	-
Pitti	0.02	10	-	-
<b>Total</b>		<b>632</b>	<b>89</b>	<b>15</b>



The immediate threat to sea turtles and their nesting beaches in Lakshadweep is beach armoring, human habitation reaching closer and closer to the beach, lighting and clearing of beach vegetation for coconut plantation. Amongst these, beach armoring is the most serious threat as it leaves little or no space for turtles to nest once the concrete tetrapods are positioned on the beach to check erosion. Tourism in the lagoons and on the islands is slowly becoming an additional pressure for sea turtles due to disturbance during foraging and nesting.

### **Recommendations**

1. All species of sea turtles occurring in Indian waters are listed as endangered and are included in Schedule I of the Indian Wild Life (Protection) Act, 1972. The department of Environment and Forests, Lakshadweep has banned killing and poaching of turtles but due to lack of staff in far reaching islands this is ineffective. Therefore the department needs to be strengthened to check illegal poaching. Also, the Government of Lakshadweep should provide a subsidized substitute for green turtle oil to the islanders to discourage killing of turtles for oil.

2. Beaches with natural vegetation of *Pemphis* and *Scaevola* appear to be favorable for sea turtle nesting. Therefore such vegetation near the beach should not be removed and their role in forming sea turtle nesting beaches should be studied.

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3. There should a be complete ban on coral collection, sand mining and removal of other natural resources from the island coasts for any purpose. This will help to check beach erosion and eliminate the need for beach armoring.

4. Developmental activities such as human habitation, lighting and beach armoring need to follow the guidelines of coastal zone management plan Act, 1997 of Lakshadweep.

5. An effective, education campaign should be started in all islands on the importance and benefit of turtles to islanders. Sea turtle based tourism has a bright future in Lakshadweep, which in turn could benefit the islanders but it should be monitored carefully.

6. The high intensity turtle nesting areas such as Suheli Valiakara, Tinnakara and the most important green turtle foraging grounds such as the Agatti lagoon should be declared as protected areas with permission for artisanal fishing practices only.

**Acknowledgements** - We thank the Wildlife Institute of India, Dehradun and Government of India – United Nations Development Programme's Sea turtle project for funding support. We acknowledge the Lakshadweep Administration for permits, logistic support and Environment and Forest Department for help during the survey work.

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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