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# Sea Turtles along the Karnataka Coast[1]

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The olive ridley sea turtle is the only species of sea turtle known to nest along the coast of Karnataka (Kar and Bhaskar 1982). There are some media reports of large turtles occurring in the small islands off the Honnavar coast, possibly green or leatherback turtles. The nesting of olive ridleys is sporadic along the Karnataka coast (Madhyastha et al 1986).

From October 1984 to March 1985, the author studied the nesting frequency of olive ridleys between Mangalore and Mukka along the Karnataka coast (16 km). He established a hatchery at Bengre and 2,560 hatchlings were released in 1984 (Madhyastha et al 1986). In 1985, the Karnataka forest department organised hatchery programmes at three different locations, during which period a total of 15,000 hatchlings were released (Appayya 1985). According to these studies, the nesting density at Bengre in 1985 was 0.75 nest/km. A market survey in 1985 also recorded 774 eggs for sale at one source in Mangalore, confirming the consumption of sea turtle eggs in this area. For nearly two decades since then, there has been no information on sea turtles from Karnataka. This study was conducted for a year, between November 2000–October 2001, to update information on sea turtles and their nesting habitats along the Karnataka coast.

## Study Area

The state of Karnataka on the west coast of India has a 260-km long coastline. It's coastline is mostly rocky, interspersed with a few sandy beaches. The three coastal districts of the state are: (i) Dakshina Kannada, the southern-most district, with its headquarters in Mangalore, and sharing its border with the state of Kerala to the south, (ii) Udupi, a newly formed district (which will be included as part of Dakshina Kannada in this chapter),

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and (iii) Uttara Kannada, the northern-most district, which has a border with Goa in the north. Several of the peninsular rivers flow into the Arabian Sea along the Karnataka coast. Of the fifteen major rivers in Dakshina Kannada and four in Uttara Kannada that join the Arabian Sea, the Nethravathi, Sharavathi and Kali are important and have large estuaries. The mouths of the Kollur, Chakra and Haladi have substantial mangrove vegetation. Numerous fishing villages are present along the Karnataka coast and several minor ports offer facilities to thousands of fishing boats. Most of the fishing boats are traditional purse seine boats and a significant proportion of fishing vessels are medium-range trawlers. To support the marine fishing industry, the Karnataka coast also has a considerable number of ice plants and seafood processing units.

## Methods

### PRELIMINARY SURVEY

A preliminary survey was conducted to collect information from coastal inhabitants, particularly fisher folk, about sea turtle nesting locations along the coast. The survey was based on interviews with older coastal residents. Coastal village markets were also surveyed during this time to check whether sea turtle eggs were being sold. Wherever sea turtle eggs were observed in the market, a certain number of eggs were purchased to determine the market price. A total of 35 locations along the coast were surveyed and information on sea turtle nesting was collected. During the preliminary survey, beach walks were organised involving local college students and non government organisations; these also served to educate local youth about sea turtle conservation. During the turtle walks conducted for two hours at dawn, crawls, nests and predated nests were counted.

### NESTING SURVEY

Based on the preliminary survey, information from 40 nesting sites, Uttara Kannada (13) and Dakshina Kannada (27), was gathered. To estimate nesting densities, three stretches of eight km each were sampled at Mangalore, Maravanthe and Murdeshwar (two in Dakshina Kannada, one in Uttara Kannada). Each stretch was sampled by a team of five members—consisting of one local, three students and the investigator. Sampling was repeated in the first week of November and December 2000, and January 2001. Hence, 24 km out of 260 km was sampled three times. Carcasses and remains of turtles were documented along the beach and in the fishing villages.

## Results

### SEA TURTLE NESTING STATUS

Only olive ridley nesting was confirmed along the Karnataka coast during the present survey. Interviews indicated that peak nesting occurred in September and October. Despite the presence of many industries, seawalls, shipping and fishing ports and coastal roads, sea turtles still nest at about 40 nesting sites close to 12 major river mouths and estuaries, some of which support mangrove forests (Table 1). In Dakshina Kannada (144 km), 12 nests were located during surveys with a nesting density of 0.25/km/survey and an average clutch size of 98 eggs. In Uttara Kannada (116 km), only 8 nests were found with a nesting density of 0.33/km/survey and an average clutch size of 105 eggs.

**Table 1.** Sea turtle nesting locations in Dakshina Kannada and Uttara Kannada districts.

| Occasional nesting sites | | Frequent nesting sites | |
|---|---|---|---|
| Dakshina Kannada | Uttara Kannada | Dakshina Kannada | Uttara Kannada |
| Padubidri | Sirali | Talapadi | Bhatkal |
| Hejmadi | Kaikini | Ullal | Murdeshwara |
| Yermal | Gunavanthe | Tanneeru bavi | Kumta |
| Moodubella | Maki | Bengre | Amadalli |
| Katpadi | Karsarkod | Panaboor | Chandya |
| Udyavara | Kadri | Haleangadi | Majali |
| St Mary's Island | Gokarna | Pavanje | |
| Hangarakatte | | Pangala | |
| Kota | | Ambalpadi | |
| Voderahobli | | Koteshwara | |
| Uppunda | | Gangolli | |
| | | Maravanthe | |
| | | Kerimanjeshwara | |
| | | Kambadakone | |
| | | Sirur | |
| | | Bainduru | |

### SEA TURTLE MORTALITY

Carapaces and skulls of olive ridley turtles were encountered along the coast of Dakshina Kannada district. However, not many complete carcasses could be located as fisher folk remove the shells as soon as they dry. Hawksbill carapaces were also found in the houses of several fisher folk. However, it was not clear whether these shells were collected from the shore or whether the turtles were hunted at sea. Most fisher folk also reported the sighting of a large number of adult turtle carcasses floating in the sea.

### TRADE IN TURTLE EGGS

A total of 10 markets, six in Dakshina Kannada and four in Uttara Kannada were visited during the survey. Sea turtle eggs were being sold clandestinely and a total of 7,056 eggs from the Dakshina Kannada and 2,912 eggs from the Uttara Kannada markets were purchased at a price of Rs 2.30 each. Of the 20 nests located during the 2000–01 survey, 14 nests were predated by humans.

## Threats

### SEAWALLS

The large-scale seashore erosion along the coast of Karnataka and the resultant mitigatory response of building armouring structures such as seawalls is a common phenomenon. Five–eight-metre-high seawalls, 30–40 m from the low tide line, have rendered vast stretches of the Karnataka coast unsuitable for sea turtle nesting (Figures 1 and 2).

### COASTAL ROADS AND ILLUMINATION

A highway runs along the Karnataka coast at a distance of 10–20 m from the high tide line (Figures 1 and 2). Fishing villages are located all along the highway, illuminated

with sodium vapour and halogen lamps, and in some places with 1,000-watt halogen lamps directed towards the beach. Coinciding with the sea turtle nesting season during the winter months, the coastal communities and the fisher folk celebrate various festivals, increasing artificial illumination.

Despite being heavily impacted by seawalls, coastal roads, ports and industries, and dense human settlements, the Karnataka coast still harbours important sea turtle nesting sites wherever sandy, undisturbed nesting beaches occur. These nesting sites are monitored by fishing communities to harvest the eggs which generate supplementary income. Both religious sentiments and awareness of the Indian Wildlife (Protection) Act, 1972 prevents the killing of adult sea turtles. However, harvesting of eggs appears to be intensive. Predation by domestic and feral dogs and consumption of turtle eggs by coastal-dwellers are major threats to the olive ridley population on this coast. The offshore mortality of adult turtles combined with the impact of removal of eggs may result in the complete loss of sea turtles along the Karnataka coast.

The seawalls along the coast do not leave much nesting habitat for the turtles. Therefore, it is important to identify all sporadic nesting sites and develop a mechanism by which these nests can be saved from predation. The hatchery programmes operated earlier by the Karnataka forest department may need to be re-established with active community participation. Rajagopalan et al (1996) recorded fishery-related mortality of sea turtles on the Karnataka coast which, though minimal, is still prevalent, as indicated by olive ridley and hawksbill carapaces.

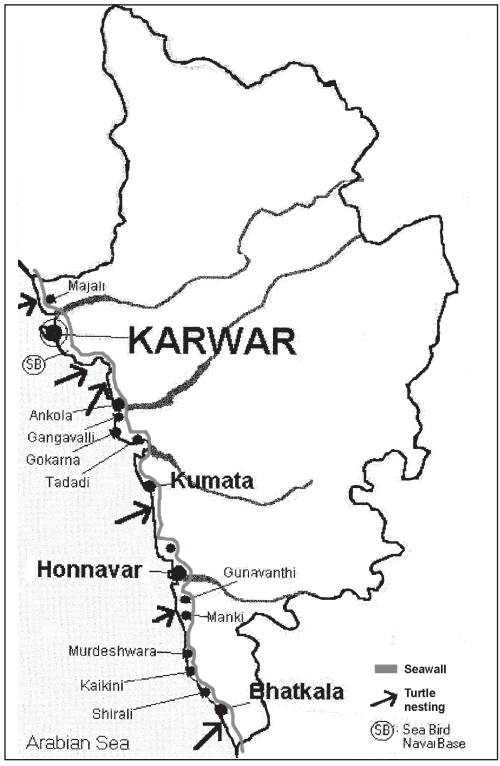


**Figure 1.** Uttara Kannada; olive ridley nesting sites are depicted with an arrow.

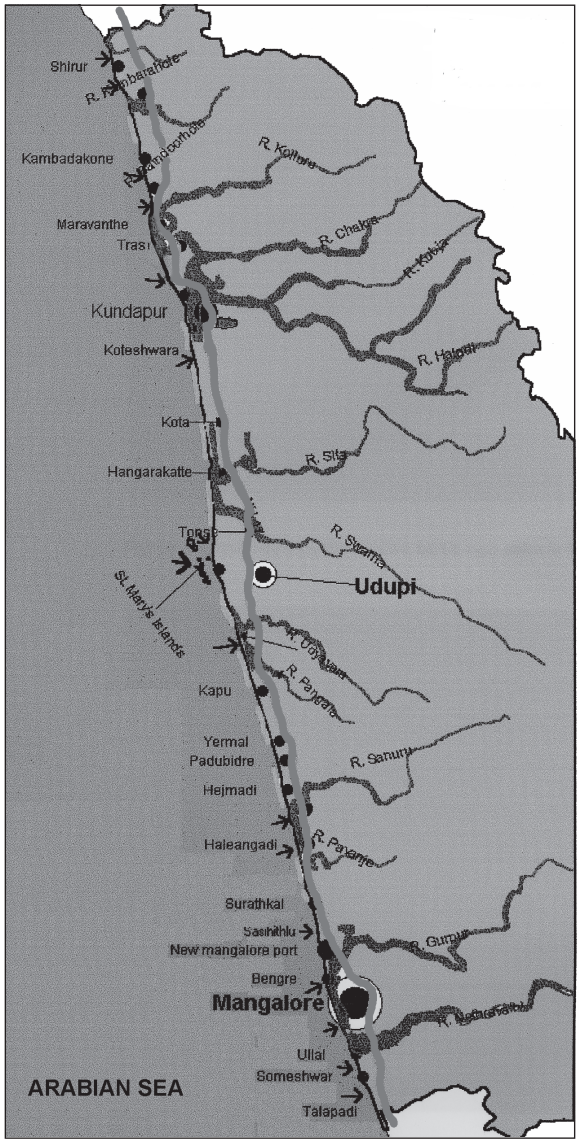


**Figure 2.** Dakshina Kannada; olive ridley nesting sites are depicted with an arrow.

## Conservation Management

The involvement of local people in turtle walks and a nest protection programme during the survey reflects a positive attitude towards the conservation of sea turtles (Sharath 2001). There is a need to conduct education and awareness programmes for local school teachers, nature clubs in schools and colleges and in coastal villages. Such programmes also need to include the upcoming naval base near Karwar, and port, fisheries and state highway officials. There are a large number of NGOs on the Karnataka coast, most of them working with coastal fishing communities. These coastal NGOs needs to be brought into a network to participate in sea turtle conservation.

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## Literature Cited

Appayya M K. 1985. Sea turtle conservation with particular reference to Karnataka. *My forest* 21(2): 89–90.

Kar, C S, and S Bhaskar.1982. Status of sea turtles in the eastern Indian ocean. In *Biology and conservation of sea turtles,* ed. K Bjorndal. Washington D C: Smithsonian Institution Press. 365–372.

Madhyastha M N, B K Sharath, and I J Rao. 1986. Preliminary studies on marine turtle hatchery at Bengre beach, Mangalore. *Mahasagar* 19(2):137–140.

Rajagopalan, M, E Vivekanandan, S K Pillai, M Srinath, and A Bastion Fernando. 1996. Incidental catch of sea turtles in India. *Marine Fisheries Information Services T & E Series*. 143: 8–16.

Sharath, B K. 2001. Status survey of marine turtles along the coast of Karnataka. In *Proceedings of the National Workshop for the Development of a National Sea Turtle Conservation Action Plan, Bhubaneshwar, Orissa*, ed. K Shanker and B C Choudhury. Dehradun: Wildlife Institute of India. 77.