

Status of leatherback turtles in India

By BC Choudhury

1. The legal protection status for leatherback turtles

1.1. Overview

leatherback turtles in India are fully protected in Schedule I of the Wildlife Protection Act (WLPA). Upadhyay and Upadhyay (2002) provide a detailed discussion of the national legislation and international instruments of India as they pertain to marine turtles in general. There is no specific legislation for leatherback turtles, but there are a wide variety of national and international instruments that are germane to protecting both the turtles and their habitats. For example; the National Biodiversity Bill, 2000; Habitat Protection: Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act (MZA); Coast Guard Act (CGA); Environmental Protection Act (EPA); Coastal Regulation Zone Notification; Ocean Regulation Zone (ORZ); Regulation of the Use of Marine Areas: Marine Products Export Development Authority Act (MPEDA); Indian Fisheries Act (IFA); Indian Ports Act (IPA); Coast Guard Act (CGA); Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act, 1981. (See Upadhyay and Upadhyay 2002, for details).

1.3. Management agencies responsible for marine turtle conservation

Operational level Name and type of agency

National level	Specifically: Ministry of Environment and Forests (including Chief Wildlife Wardens' Offices in each state, and Wildlife Institute of India); Also: Coast Guard, Ministry of Transport, Department of Ocean Development, Ministry of Commerce (particularly Marine Products Export Development Authority), Ministry of Petroleum and Natural Gas, Ministry of Tourism, Ministry of Defence, Ministry of Shipping
State level	At least Fisheries and Wildlife Departments of the states of West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra, and Gujarat, as well as Union Territories of Andaman & Nicobars and Lakshadweep Islands
Local level	Highly diverse from township to township and from state to state

2. Nesting populations

2.1. Evidence of leatherback turtle nesting

Historical Evidence:

The first documented record of leatherback nesting in India seems to be from 1923, off Quilon (now "Kollam"), Kerala (Cameron 1923), with a second record 36 years later from near Calicut (now "Kozhikode"), Kerala (Jones 1959). Pillai et al. (2003) reported 13 leatherback records from the Indian mainland between 1923 and 2003. Of these, there were only two reports of nesting, just cited above. The only evidence of regular nesting outside of the Andaman and Nicobar Islands is recounted in Cameron (1923), who was told by fishermen that some 40 turtles used to nest annually at Kollam in the early part of the 20th century.

Current Situation:

The Andaman and Nicobar Islands is a globally significant region for nesting marine turtles especially the leatherback turtles (*Dermochelys coriacea*) in the Indian Ocean. Most rookeries were only found in 1979 and 1990; in 1997 two nesting beaches in the Andamans were discovered and in 2001 three nesting beaches were found on the east coast of Great Nicobar Island (Andrews et al. 2002). Three main islands have been identified (Bhaskar 1981; Bhaskar 1993), and more recently, for containing sites with intensive nesting of leatherback turtles (Andrews et al. 2001). These include:

- Andaman Archipelago. Little Andaman in the Andaman archipelago (South and West Bay beaches) and two islands;
- Nicobar Islands. 17 locations have been confirmed in the Nicobar archipelago (Little Nicobar and Great Nicobar Island) (Andrews et al. 2002; Choudhury 2005) Figure 1

- Little Nicobar Islands: Five nesting locations have been identified on the western shores (Andrews et al. 2002). Important nesting beaches identified in the Little Nicobar Islands were mainly on the west coast including Pulo Kiyang, Pulo Baha, and beaches on Kiyang and Akupa hamlets (see table 1).
- Great Nicobar Islands: Five nesting locations along the west and east coasts (Andrews et al. 2002) these contain two important nesting sites, one on the West Coast (beaches at the mouth of Alexandra and Dogma rivers) and other on the South east coast (Galathea bay) (in Choudhury (2005): See table 1).
- Other Islands: Other islands where the species has been observed to nest include, Teressa and Katchal (West bay) in the Central Nicobar Islands (in Andrews et al. 2002; Choudhury 2005): see table 1).
- Mainland. The paucity of records – only 13 between 1923 and 2003 (Pillai et al., 2003) – indicates that the species is rarely sighted along the coast of the Indian mainland, from both the waters of the Bay of Bengal as well as the Arabian Sea. Cameron's (1923) account indicates that the species was extirpated, at least from the coast of Kerala. Given the intensity of fishing activities along much of the mainland coast of India, it would not be surprising if human impacts had had strong negative impacts on leatherbacks, but with the lack of records, and systematic sampling efforts, great caution much be used when interpreting the little available information.

While scattered data from the Andaman and Nicobars are available for the last decade, there is not sufficient data to provide an adequate historic baseline, or estimate trends. Data from the Indian mainland are too sparse to be able to interpret accurately, but all available evidence indicates that leatherbacks rarely nest on mainland beaches (Pillai et al. 2003).

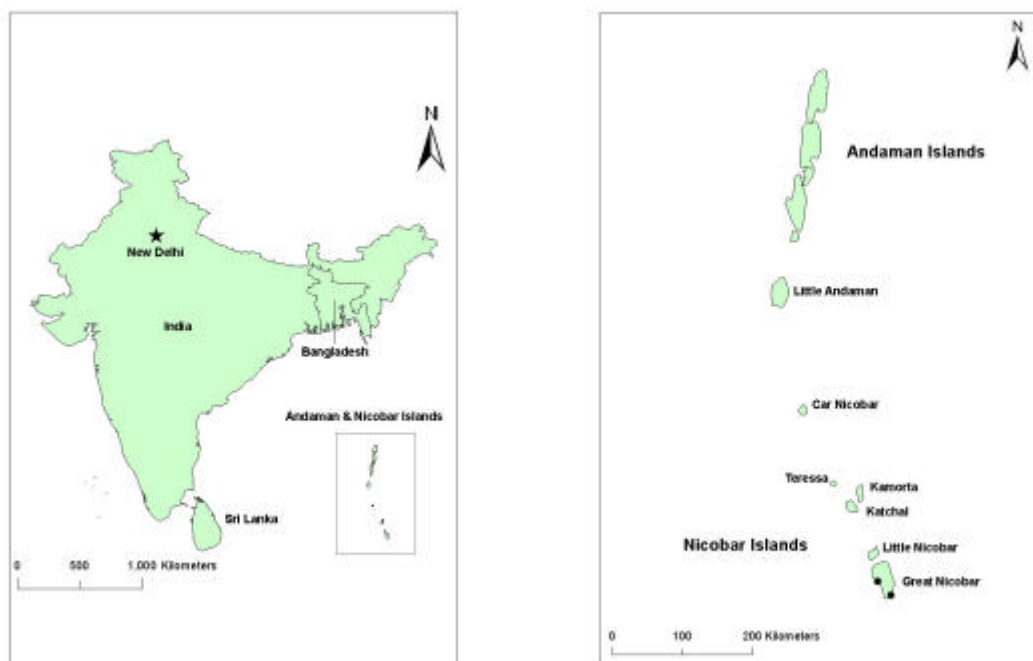


Figure 1. (a) Mainland India in relation to other nations and (b) the Andaman and Nicobar Islands

Table 1: Locations of leatherback turtle nesting beaches, and results of annual surveys

Beach name	Latitude of beach	Longitude of beach	Year of survey	Annual number	Type of data (e.g. turtles, nests, eggs)	Reference
<u>Little Andaman</u>						
All beaches			2000/01	100 ¹	Turtles	Ref 1
South Bay	10°32.58'N	92°24.68'E	1981	10 ¹	Nests	Ref 3
West Bay	10°38.26'N	92°24.8'E	1984	84 ¹	Nests	Ref 3
			1999	34 ¹	Nests	
<u>Little Nicobar</u> (on west coast)						
All beaches			2000/01	100	Turtles	Ref 1
<u>Great Nicobar</u>						
West coast at Alexandra river	7°00.75'N	93°41.88'E	1991/92	343	Nests	Ref 6
			2000/01	866 [*]	Nests	Ref 6
West coast at of Dogma river	6°59.25'N	93°43.63'E	1991/92	171	Nests	Ref 6
			2000/01	362 [*]	Nests	Ref 6
South east coast at Galathea bay	6°48.93'N	93°51.25'E	1991/92	158	Turtles	Ref 4
			1993/94	237 ²	Nests	Ref 5
			1995/96	282 ³	Nests	Ref 6
			1997/98	124 ³	Nests	Ref 6
			2000/01	146	Turtles	Ref 6
				444	Nests	
			2001/02	177	Turtles	Ref 6
				425	Nests	
			2003/04	290	Females	Ref 7
All beaches			1991/92	166 [#]	Turtles	Ref 2
<u>Central Nicobar Islands</u>						
Teressa Is.			2000/01	25	Turtles	Ref 1
Katchal Is. (West bay)	7°54.81'N	93°20.76'E	2000/01	25	Turtles	Ref 1

* Survey results from March, April and July 2001

Possible under estimated – as only 8 of 9 sites were surveyed and many only surveyed at the end of the season (Andrews 2002).

1. Monitoring of less than a complete season at the location
2. Monitoring in March 1993 and April 1994
3. Forest Department records; December 1995 to February 1996 and December 1997 to February 1998.

Andrews et al. (2002) state that during the 2000 and 2001 nesting season, data from tagging studies and nest counts the nesting population sizes for the Andaman Nicobar Island rookeries are:

- o Great Nicobar Island is 483 females
- o Little Andaman is 100 females
- o Katchal Island is 25 females
- o Teressa Island is 25 females
- o Little Nicobar is 100 females

References

1. = Andrews et al. (2002)
2. = Andrews (2000)
3. = Bhaskar (1993)
4. = Bhaskar and Tiwari (1992)
5. = Bhaskar (1994)
6. = Andrews et al. (in press)
7. = Andrews and Tripathy (2004)

2.2. Seasonality of leatherback turtle nesting

In the Andaman and Nicobar Islands the nesting season starts in late September, peaks during the month of December and spreads to April with scattered nesting occurring until July (Andrews et al. (in press)).

2.3. Genetic studies on nesting populations of leatherback turtles

Unknown

2.4. Biological parameters

See Table 2.

Table 2. Summary of biological data collected from leatherback turtles from India

Category of data	Average	Standard deviation	Range	Sample size	References
Size of nesting females	190&212cm 155.7cm	- -	- -	- 125	Pillai et al. (2003) Andrews et al. (in press)
Number of eggs per clutch	No data available				
Clutches per season	3.96 4.9	- -	- 1-7	82 -	Andrews et al. (2002) Bhaskar (1993)
Re-nesting interval (days)	10.1 12.5	- -	8-14 7-47	- 82	Bhaskar (1993) Andrews et al. (in press)
Number of years between breeding seasons (years)	8	-	-	1	Andrews et al. (in press)
Size of eggs (cm)	No data available				
Size of hatchlings (cm)	No data available				
Incubation success (%)	No data available				

Various measurements of 13 leatherbacks recorded from mainland beaches are reported by Pillai et al., (2003). These include curved carapace lengths (CCL) that varied from 93 to 212 cm and body weights that ranged from 110 to 350 kg. The two nesting females were reported to be 190 and 212 cm CCL, and the larger to weigh 272 kg (Pillai et al., 2003).

2.5. Pivotal Temperatures studies

Unknown

2.6. Migration records of nesting leatherback turtles

Unknown, however Andrews (2000) mentions that Australian tagged leatherback turtles have been observed nesting on Galathea Beach (Great Nicobar Island). However, given that tags with an Australian return address had been previously supplied for use in that study area and no tag recoveries were reported to the projects that have tagged leatherback turtles in Australia, it is highly likely that these turtles, supposedly from Australia, had in fact been tagged and recaptured in the Nicobar Islands (Col Limpus Pers. Comm.).

2.7. Protection of nesting beaches (e.g. National Parks)

Protected area status is conferred on the Nicobar Islands, for access is strictly controlled; even Indian citizens (not including residents of the Islands) must have permission to visit. In the Andaman Group 69% of the land is comprised of reserves and protected areas (36% as tribal reserves) and the entire Nicobar Group is designated as a tribal reserve, and there are four wildlife sanctuaries.

2.8. Hatcheries used to protect leatherback turtle nests

Unknown

2.9. Threats to nesting leatherback turtles

Potential threats on mainland beaches include intentional predation of nesting females and/or their eggs, egg predation by feral dogs and other predatory mammals, and entanglement in gear, such as nets on beaches (see also section 3.7 on bycatch). However, the numbers of leatherback turtles nesting on the mainland is so small that these are not likely to be substantive issues, at least for this species. Depredation of eggs, turtles and hatchlings by feral dogs is a major problem for beaches in the Andaman-Nicobar Islands. Indeed it has been estimated that feral dogs may predate 70% of eggs at some locations. On the west coast of Great Nicobar between December 2000 and March 2001 feral dogs and domestic pigs preyed on 60 and 10% respectively of the 866 nests recorded (Andrews et al. in press).

Incidental capture and consumption of meat and eggs are also threats to the nesting populations of leatherback turtles. However, these have not been quantified specifically for leatherback turtles (Andrews et al. in press).

2.10. Coastal development & sand mining

Beach armoring is a significant problem at least in Kerala (Dileepkumar and Jayakumar in press). However, the numbers of leatherbacks nesting on the mainland is so small that this is not likely to be a substantive issue, at least for this species. On the Andaman-Nicobar Islands the main threat for all species of nesting turtles is sand mining for construction (Andrews et al. in press).

3. Foraging populations

3.1. Details of any leatherback turtle foraging area census or tagging results.

Unknown

3.2. Seasonality of leatherback turtles in coastal and offshore waters

Unknown

3.3. Approximate size range of leatherback turtles caught or seen in foraging areas

Unknown

3.4. Information on diet of leatherback turtles

No specific studies are known

3.5. Other biological studies conducted on leatherback turtles in foraging areas

Unknown

3.6. Threats to foraging populations of leatherback turtles

See section 3.7 on bycatch

3.7. Fisheries bycatch of leatherback Turtles

leatherback turtles are reported to be caught accidentally in a variety of fishing gear: gillnets (Tamil Nadu and Kerala); trawl nets (Tamil Nadu); and beach seines (Kerala) (Pillai et al., 2003). It is not known if these sorts of fishing present specific threats to females that are approaching or leaving nesting beaches, or simply general threats to the species. As only eleven leatherbacks have been reported captured in diverse fisheries over the eighty-year period from 1923 to 2003, it appears that incidental catch is not a common problem. Andrews et al. in (press) indicate that incidental capture of turtles is a threat to nesting and foraging populations in the Andaman-Nicobar Islands, however the numbers per species are not stated (Andrews et al. in press).

2. Conservation Actions

Areas of change

Awareness raising programmes

Fishery controls

Summary including report references

Various and diverse initiatives on the mainland, but of limited direct relevance to leatherbacks

Various and diverse initiatives on the mainland, but of limited direct relevance to leatherbacks

5. References

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