

# Status of leatherback turtles in Sri Lanka

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## 1. The legal protection status for leatherback turtles

### 1.1. Overview

In Sri Lanka, marine turtles are legally protected under the Fauna and Flora Protection Ordinance, No 2 of 1937 and the Fisheries and Aquatic Resources Act, No 2 of 1996. In 1979, Sri Lanka entered into the CITES agreement which prohibits member nations from export or import of turtles and their parts and products. All five species of marine turtles and their eggs, both on land and sea, are completely protected by amendments to the Fauna and Flora Protection Ordinance in 1970 (for the leatherback turtle) and by regulation in 1972 (for the other four turtle species). The punishments meted out to offenders have been increased by the Fauna and Flora Protection (Amendment) Act No 49 of 1993 (Parliament of the Democratic Socialist Republic of Sri Lanka, 1993).

Under Section 30 of the Fauna and Flora Ordinance (as amended), it is an offence to kill, wound, harm or take a turtle, or to use a noose, net, trap, explosive or any other device for those purposes, to keep in possession a turtle (dead or alive) or any part of a turtle, to sell or expose for sale a turtle or part of a turtle, or to destroy or take turtle eggs. A person who commits any of these offences is liable to a fine of Rs 10,000 – 30,000 or to imprisonment of 2-5 years or to both.

Section 40 of the Fauna and Flora Protection Act prohibits export of a turtle, any part of a turtle or turtle eggs from Sri Lanka, except with the authority of a permit issued by the DWLC. Such a permit can be issued only for scientific purposes and not for trade in turtles or parts (which includes tortoise shell ornaments as well). Violation of this section carries a fine of Rs 20,000 – Rs 50,000 and/or a jail term of 5-10 years. Import of a turtle, any part of a turtle or turtle eggs, without a permit issued by the DWLC is an offence under Section 37 of the Fauna and Flora Protection Act, and if found guilty, liable to a fine of Rs 5,000 – Rs 10,000 and/or a jail term of 25 years (Parliament of the Democratic Socialist Republic of Sri Lanka, 1993).

In terms of Section 29 of the Fisheries and Aquatic Resources Act, regulations can be made to ban the capturing, landing, transportation, selling, buying, receiving or keeping in possession of any prohibited species of fish. The definition of “fish” in this Act is broad enough to include every aquatic animal, from mammals to invertebrates. An offence under this Section is punishable with a fine not exceeding Rs 3,000 and/or a jail term not exceeding 6 months. Section 30 (1) of this Act also empowers the minister in charge of the subject of Fisheries and Aquatic Resources to make regulations to prohibit or regulate the export from or import into Sri Lanka, of turtles or their derivatives (Parliament of the Democratic Socialist Republic of Sri Lanka, 1993).

### 1.2. Management agencies responsible for marine turtle conservation

Operational level	Name and type of agency
National level	Department of Wildlife Conservation, National Zoological Department, Coast Conservation Department, Sri Lanka Customs, National Aquatic Resources and Development Agency, Marine Pollution Prevention Authority, Central Environmental Authority
State level	
Local level	

## 2. Nesting populations

### 2.1) Overview

#### *Summary of historical evidence*

There is no historical evidence about the numbers of nesting females in various places. For the entire country, there is no leatherback turtle assessment done by any one. However some data can be found from the eggs collected in turtle hatcheries (Wickramasinghe 1982), as follows:

- Kosgoda turtle hatchery: Between the period of 10 Dec 1981 and 4 April 1982 this hatchery released 249 leatherback turtle hatchlings (4.8% from the total hatchlings they produced, the balance were other species)
- Bentota turtle hatchery: Between the period of 14 December 1981 and 4 April 1982 this hatchery reburied 275 leatherback turtle eggs (5.65% from the total eggs reburied, the balance were other species)

#### *Summary of current situation*

The locations of leatherback turtle nesting sites are shown in Figure 1. Recent leatherback turtle nesting numbers are shown in Table 1. Both TCP and NARA have done some data collection from various nesting beaches in Sri Lanka (TCP beach survey 1999). During the period of July 1995 and August 1996, NARA surveyed the beaches between Karathivu and Yala and stated that no nesting beaches remain in the Puttalam and Gampaha Districts. Some beaches of the Colombo, Kalutara and Matara districts are still occasionally visited by turtles including leatherback turtles. Most of the important nesting beaches are located in the districts of Galle and Hambantota (Amarasooriya and Gunawardana 1997). NARA has also classified the nesting beaches based on nesting frequencies (Amarasooriya 2000). According to the TCP data, Godawaya beach has the largest leatherback nesting population. 333 leatherback nests were reported between March 2001 and November 2001 and it was estimated 170 adult females of total nesting population use on the Godawaya beach (Ekanayake et al. 2002). For the entire season of 2005 only two leatherback turtle nests were recorded at Godawaya Beach which is abnormal. While it is too early to link it to the effects of the tsunami a lot of sand erosion has occurred due to the tsunami in Godawaya Beach. IUCN Sri Lanka has surveyed the beaches between Tangalle and Yala between the period of 2004 and 2005 and final report has yet to be published.

Between 2000 and 2004 leatherback turtle eggs laid at Rekawa Beach and Bundala National Park were collected and reburied by the wildlife department but their data has not been analysed and published. There are occasional leatherback turtle clutches laid along beaches on the south western coast (around Kosgoda). However the entire beach is 4km in length and TCP monitors only 1km. Since 2003 TCP recorded only one leatherback turtle clutch in their 1km of beach, however there could have been more leatherback turtle nests laid along the other 3km of the beach and purchased by the hatchery owners.

Leatherback turtles are mostly found to be nesting on beaches located in the dry zone of the southern coast line. Leatherback turtles nest in Godawaya in reasonable numbers and Kosgoda, Rekawa, Ussangoda, Kalametiya, Bundala, Yala are some of the other known nesting areas for leatherback turtles. Numbers of nesting females have not been recorded accurately for many beaches. Groombridge (1985) estimated the nesting population to be several dozen but probably less than 100. However, Salm (1976) found 173 leatherback nest excavations at Yala National Park between 9-13 June 1975 and 333 nests were estimated by TCP in 2001 at Godawaya (Ekanayake et al. 2002). IUCN's regional conservation strategy recognizes the Sri Lanka and the Andaman and Nicobar Islands of India as the last three areas in the region that have substantial nesting populations of leatherback turtles (IUCN 2001).

Table 1. Results of the annual monitoring of leatherback nesting populations.

Beach name	Latitude of beach	Longitude of beach	Year of survey	Annual number	Type of data (e.g. turtles, nests, eggs)	Reference
Duwemodara 0.5 km			1997- 1998	NA	eggs	Ref 3.
Bandarawatta 1 km			1997- 1998	NA	eggs	Ref 3.
Kosgoda 1.25 km			1997- 1998	NA	eggs	Ref 3.
Rekawa 3.5 km	06° 02' 36.0N to 06° 02' 39.5N	80° 49' 53.7E to 80° 51' 33.0E	1996 1997 1998 1999 2000	3?&3N 7?&10N 10?&17N 11?&13N 8?&12N	Turtles and nests	Ref 3 & Ref 4.
Kahandamodara – Gurupokuna beach 3 km	06° 03' 47.4N to 06° 04' 17.6N	80° 53' 04.6E to 80° 55' 07.0E	1997 1998 1999	NA	Eggs & nests	Ref 3 & Ref 4.
Godawaya 3 km	06° 06' 19.6N to 06° 06' 36.0N	81° 01' 36.1E to 81° 03' 11.9E	1997 1998 1999 2001	333 nests 170 females	nests	Ref 2, Ref 3 & Ref 4.
Ussangoda welipatanwila 2 km	06° 05' 24.1N to 06° 05' 59.6N	80° 58' 53.5E to 80° 59' 46.1E	1997 1998 1999 2001	NA	nests	Ref 2, Ref 3 & Ref 4.
Bundala 12 km	06° 09' 28.9N to 06° 11' 46.3N	81° 10' 59.2E to 81° 17' 45.6E	1997 1998	NA	nests	Ref 3
Amadoova Mahaseelava Yala NP) 4 km	to (in to 06° 17' 12.9N to 06° 18' 18.0N	81° 25' 55.0E to 81° 27' 53.8E	1982	NA	eggs	Ref 5
Gonalehebb Kalliya Kalapuwa (in Yala NP) 3 km	to to 06° 21' 21.0N to 06° 21' 50.3N	81° 30' 31.0E to 81° 32' 50.1E	1982	NA	eggs	Ref 5

*References cited*

1. Ekanayake and Kapurusinghe (2000).
2. Ekanayake et al. (2002).
3. Amarasooriya (2000).
4. TCP Beach survey report (1999)
5. Wickramasinghe (1982).

2.2. Seasonality of leatherback turtle nesting

April to August (unpublished TCP data)

2.3. Population Genetic Studies of Nesting leatherbacks

No genetics projects have been conducted on leatherback turtles in Sri Lanka

2.4. Biological parameters

Curved carapace length (CCL) and curved carapace width (CCW) were measured from all nesting leatherback turtles in Rekawa between 1996 and 2000 (Table 2). A sample of ten eggs was measured from each clutch. A sample of ten hatchlings was measured from each hatching emergence. Nesting behaviour was observed and recorded. Leatherback turtles were tagged in Rekawa.

Table 2. Summary of biological data collected from leatherback turtles in Sri Lanka

Category of data	Average	Standard deviation	Range	Sample size	References
Size of nesting females	CCL:151.9cm CCW:109.7cm				TCP Unpubl. Data
Number of eggs per clutch	100.5 82.8			30 nests 55 nests*	TCP. U.D
Clutches per season	No available data				
Re-nesting interval (days)	No available data				
Number of years between breeding seasons (years)	No available data				
Size of eggs (cm)	53.2 mm			34 nests	TCP. U.D
Egg weight	79.6 g 41.3 g			33 nests 55 nests*	TCP. U.D
Size of hatchlings (cm)	Lth: 5.35 cm Wth: 3.27cm			55 nests*	TCP. U.D
Incubation success (%)	No available data				
Incubation period	59.6 days			55 nests*	TCP. U.D
Average nest depth	89.5 cm			55 nests*	TCP. U.D

Nesting times: Emergence: 14.8 Minutes, Body pit digging: 14.8 Minutes, Nest chamber digging: 21.2 Minutes, Egg laying: 11.6 Minutes, Egg chamber cover: 11.1Minutes, Body pit cover: 34.1Minutes, Return to water: 8 Minutes

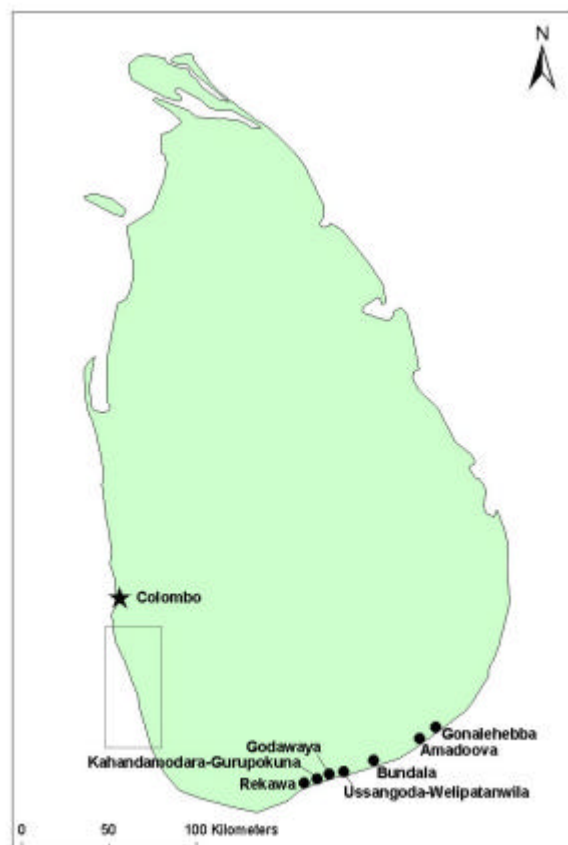


Figure 1. Locations of leatherback turtle nesting sites in Sri Lanka

\* TCP unpublished data from Rekawa beach September 1996-July 2000.

2.5. Pivotal temperature studies

Data not available for leatherbacks

2.6. Migration records for tagged nesting leatherback turtles

Data not available for leatherback turtles in Sri Lanka. No recaptures of tagged turtles other than returning to the same beach for laying eggs.

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

<b>Name of the beach(s)</b>	<b>Name of the National Park</b>
Bundala	Bundala National Park
Yala	Yala National Park
Wilpattu	Wilpattu National Park

*Planned protection for nesting beaches*

<b>Name of the beach(s)</b>	<b>Name of the planned National Park</b>
Rekawa	“Rekawa Marine Turtle Sanctuary” will be declared as a turtle sanctuary by the Department of Wildlife Conservation

2.8. Use of hatcheries to protect leatherback turtle nests

Hatcheries are used to protect leatherback turtle nests.

*Summary*

Turtle hatcheries are mainly located in Bentota, Induruwa and Kosgoda areas. In 1994 the Turtle Conservation Project (TCP) surveyed 16 marine turtle hatcheries in Sri Lanka (Richardson 1996). In agreement with Hewavisenthi (1993), the subsequent report concluded that hatchery management practices were not contributing to the conservation of marine turtles effectively. The TCP report also included a draft proposal for the establishment of a hatchery licensing scheme to be implemented by the Department of Wildlife Conservation (DWLC) and the Ceylon Tourist Board (Richardson 1996).

Status of the existing turtle hatcheries along the West, South-West and Southern region has been investigated by NARA between the period of July 1995 and June 1996. The report says that the main reason or aim of all these hatcheries except two was income generation through tourist attraction (Amarasooriya 1996).

2.9. Threats to nesting leatherback turtles*Summary of threats**Killing for meat*

The slaughter of marine turtles has been widely reported (Dattari and Samarajeewa 1982). Currey and Mathew (1995), report that reliable sources informed them about the slaughter of marine turtles in Beruwela, Trincomalee, Negambo, Chilaw and Kalpitiya areas.

*Egg collection*

The most widespread form of marine turtle exploitation is the illegal poaching of turtle eggs. Almost all marine turtle nests on Sri Lankan beaches are robbed of their eggs (Kapurusinghe 2000). The eggs are either sold at markets for consumption or to hatcheries. This means that few, if any, hatchlings return to the sea under natural conditions. Salm (1976), reported that the turtle nests were dug during the day time in full view of the public at Bentota.

*Beach erosion*

In many areas the coast is being seriously eroded. This results in the destruction of nesting habitats of marine turtles. Examples for sand mining can be given from Panadura, Lunawa, Angulana and Palliyawatta (CCD 1992).

*Incidental & intentional catch of turtles*

TCP has conducted a survey on turtle by-catch between 1999 and 2000. According to the results, of the 5241 turtles recorded as by-catch (entangled), 431 were leatherback entanglements (Kapurusinghe and Cooray, 2002).

*Predators*

Feral dogs, water monitors, land monitors, jackals, wild boars, mongooses, some species of ants, crabs can be considered as natural predators on marine turtle eggs and hatchlings on nesting beaches in Sri Lanka (Kapurusinghe and Ekanayake 2000).

*Habitat loss*

Most of the nesting habitats in the western province have been either developed for tourism, resulting in the beaches being floodlit at night, or have been subject to the construction of beach armoring which have rendered the beaches totally unsuitable for marine turtle nesting. Large hotels and restaurants adjacent to the beach create a lot of noise and light.

A summary of threats to leatherback turtles in Sri Lanka and their historical and current occurrence is presented in Table 3.

Table 3. Summary of the threats to nesting leatherback turtles in Sri Lanka

Threats at this site/area	Current occurrence			Historical occurrence			
	Low	Med	High	Unknown	Low	Med	High
Exploitation of nesting females		x					x
Egg collection		x					x
Agricultural development	x				x		
Tourist development			x				x
Urban development			x				x
Industrial development			x			x	
Artificial lighting			x			x	
Coastal erosion			x			x	
Vehicles on the beach	x				x		
Sand mining		x					x
Unregulated hatchery practices			x				x
Natural threats/predation		x				x	
Other (please describe):							

2.10. Major existing threats to marine turtles

See Table 4.

2.11. Other biological studies conducted on leatherback turtles

No other biological studies have been conducted except those mentioned earlier.

Table 4: Main threats to leatherback turtles in Sri Lanka

<b>Priority 1</b>	Turtle by-catch in fishing gear
<b>Priority 2</b>	Turtle egg collection
<b>Priority 3</b>	Habitat loss
<b>Priority 4</b>	Nesting female exploitation
<b>Priority 5</b>	Coastal Development (Including tourism industry)

### 3. Foraging populations

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

There have been no tagging studies or population census work conducted in Sri Lanka on leatherback turtles.

#### 3.2. Seasonality of leatherback turtles in coastal and offshore waters

Data not available

#### 3.3. Approximate size ranges of leatherback turtles

Data not available

#### 3.4. Information on diet of leatherback turtles

Data not available

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

No other studies have been conducted.

#### 3.6). Threats to foraging populations of leatherback turtles

The main documented threat is the by-catch in fishing gear (Kapurusinghe and Cooray 2002)

A summary of existing and historical threats to foraging populations of leatherback turtles in Sri Lanka is presented in Table 4.

Table 4. Summary of threats to foraging leatherback turtles in Sri Lanka

Threats at this site/area	Current occurrence			Historical occurrence			
	Low	Med	High	Unknown	Low	Med	High
Directed take of leatherback turtles at sea	x						x
Trawl fisheries							
Gillnet fisheries			x			x	
Longline fisheries	x				x		
Other fisheries (state which ones)							
Boat strikes	x			x			
Plastics and other debris (at sea)		x			x		
Industrial effluent		x			x		
Inshore oil pollution	x				x		
Natural threats/predation			x			x	

#### a. Fisheries bycatch of leatherback turtles and the fisheries involved

Between 1999 and 2000 a bycatch survey was conducted in 16 main fishing ports in Sri Lanka. A total of 13 760 interviews were conducted with the aim of quantifying fisheries related bycatch. In total 5241 turtles were recorded as being caught by fishers. This comprised 431 leatherback turtles (8% of all bycatch) (Table 2 and 3; Kapurusinghe and Cooray 2002).

Table 2. Results of TCP turtle By-catch survey conducted in Sri Lanka between 1999 and 2000; Numbers of each species caught per each fish landing site (to see the full dataset see Kapurusinghe and Cooray 2002)

<b>Survey site</b>	<b>Total turtles caught (all species)</b>	<b>Dc</b>	<b>Total</b>
1 Beruwala	699	36	120
2 Chilaw	591	1	29
3 Colombo	881	9	142
4 Dondra	481	6	51
5 Galle	1421	40	2055
6 Hambantota	1395	2	8
7 Kandakkuliya	608		107
8 Kirinda	655	32	629
9 Kottegoda	1176	115	213
10 Mirissa	922	106	501
11 Morogalla	885		9
12 Negombo	1429	1	654
13 Panadura	350	14	27
14 Tangalle	1030	24	192
15 Wadduwa	229	1	16
16 Weligama	1008	44	488
<b>Total</b>	<b>13760</b>	<b>431</b>	<b>5241</b>

Table 3. Summary of the fisheries based threats to leatherback turtles in Sri Lanka

<b>Type of fishery</b>	<b>Months of operation</b>	<b>Number of boats</b>	<b>Impact</b> – low, medium, high or unknown	<b>Reference</b>
Gillnet fishery	Seasons vary according to locations	Over 100,000	Very high	(Kapurusinghe and Cooray 2002)

### 3.8. Other activities being undertaken to improve the conservation of leatherback turtle foraging populations

Turtle Conservation Project (TCP) has conducted a turtle by-catch reduction educational programme for fishermen and produced a by-catch reduction educational poster.

## 4. Conservation Actions

Summary of conservation actions being undertaken to address threats to leatherback turtles in Sri Lanka

<b>Areas of change</b>	<b>Summary including report references</b>
Action/recovery plans	National action plan will be published soon
Awareness raising programmes	TCP will continue its educational programmes
Research activities	Wildlife Department, NARA, TCP, IUCN will conduct more research
Managed turtle based tourism	TCP continues conducting managed turtle night watch programmes in Rekawa and Kosgoda
Annual nesting beach surveys	TCP will conduct more beach surveys in Kahandamodara area
Managed hatcheries	After the action plan
Planned protected areas	Rekawa beach will be declared as a turtle sanctuary

## 5. References

- Amarasooriya D (1996) Turtle Hatcheries. Is it additional disaster for the turtle fauna of Sri Lanka? In 'International Conference on the Biology and Conservation of the Amphibians and Reptiles of South Asia'. Kandy, Sri Lanka.
- Amarasooriya KD (2000) Classification of Marine turtle Nesting beaches of Southern Sri Lanka. In: Sea turtles of the Indo Pacific, Research, Management and Conservation. In '2nd ASEAN Symposium and Workshop on Sea Turtle Biology and Conservation'. (Eds N Pilcher and G Ismail) pp. 228-237.
- Amarasooriya D, Gunawardana MGK (1997) Present status of the Turtle Nesting Beaches of the North-Western, Western and Southern provinces of Sri Lanka. In '3rd Annual Session of SLAFAR. National Aquatic Resources and Development Agency'. Colombo.
- CCD (1992) 'Coastal 2000.' CRC Technical Report No. 2033.
- Currey D, Matthew E (1995) 'Report on an investigation into threats to marine turtles in Sri Lanka and Maldives.' Environmental Investigation Agency.
- Dattari S, Samarajeewa D (1982) 'The status and conservation of sea turtles in Sri Lanka.' March for Conservation (MFC), Colombo.
- Ekanayake, L. and Kapurusinghe, T (2000). The nesting frequency of marine turtles on the Rekawa turtle Rookery in Southern Sri Lanka. Abs. *Report of the South and Southeast Asian Regional Session of the Global Bio diversity forum.* : Colombo, Sri Lanka.
- Ekanayake EML, Kapurusinghe T, Saman MM, Premakumara MGC (2002) Estimation of the number of leatherback (*Dermochelys coriacea*) nesting at the Godavaya turtle rookery in Southern Sri Lanka during the nesting season in the year 2001. *Kachhapa*, 11-12.
- Groombridge B (1985) India's sea turtles in world's perspective. In 'Pro. Symp. Endangered Marine Animals and Marine Parks 1985' pp. 205-213.
- Hewavisenthi S (1993) Sri Lanka's hatcheries: Boon or Ban. *Marine Turtle Newsletter* **49**.
- IUCN (2001) 'A Marine Turtle Conservation Strategy and Action Plan for the Northern Indian Ocean (NIO). IUCN SSC Marine Turtle Specialist Group Publication No. 03.'
- Kapurusinghe T (2000) 'Community Participation in Turtle Conservation in Sri Lanka: A Summary of Community-Based Turtle Conservation Project's (TCPs) Activities in Sri Lanka.' U.S. Dept. Commerce. NOAA. Tech. Memo. NMFS-SEFSC-443, 57-58.
- Kapurusinghe T, Ekanayaka L (2000) Nesting frequencies of marine turtles in Rekawa, Sri Lanka September 1996 to September 1999. In 'International Conference on Sea Turtle Biology and Conservation'. Florida, USA, 2000 (in press).
- Kapurusinghe T, Cooray R (2002) 'Marine turtle by-catch in Sri Lanka.' Turtle Conservation Project (TCP). Survey Report ISBN 955-8758-01-9.
- Parliament of the Democratic Socialist Republic of Sri Lanka. Fauna and Flora Protection Ordinance (Amendment). Publ. As a Supp. to part ii of the Gazette of the Democratic Socialist Republic of Sri Lanka of Oct 22, 1993.
- Richardson P (1996) 'The marine turtle hatcheries of Sri Lanka: A TCP review and assessment of current hatchery practices and recommendations for their improvements.' TCP report submitted for DWLC and NARA.
- Salm RV (1976) 'Critical marine turtle habitats of the Northern Indian Ocean.' IUCN, Morges, Switzerland.
- TCP (1999) 'Beach survey report . Ecological Assessment on Marine Turtles on Sri Lanka's South coast between Rekawa and Godawaya.' IUCN, Sri Lanka.
- Wickremasinghe S (1982) The WNPS turtle Hatcheries Volume XVI - No: 1 Loris, WNPS.