

RPI

**DISTRIBUTION AND INCIDENTAL MORTALITIES  
OF SEA TURTLES**

*Report submitted to*  
**Ministry of Agriculture, Government of India,  
New Delhi**

*by*  
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Cochin**

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## INTRODUCTION

Sea turtles are classified as endangered species in Schedule I of the Indian Wildlife (Protection) Act , 1972 and are thereby protected. They are also incorporated in the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES). Since then, India has been playing a major role in the protection and conservation of sea turtles. Though the exploitation of eggs and nesting females has drastically reduced following the measures taken by the maritime state governments and the Government of India, a major threat which persists is the incidental catch of adult turtles in fishing gears like the trawl net and gill net. Observations on the stranded sea turtles in the Gahirmatha beach revealed that 7500 olive ridley carcasses were washed ashore during 1983 due to entangling of the turtles in fishing operations. However, there is no proper estimate on the total number of sea turtles succumbing to fishing gears. Estimation of the sea turtle nesting population which are caught by the fishing gears assumes importance considering the fact that the number and efficiency of the fishing craft and gears have considerably increased during the 1990s. In 1998, the government of Orissa imposed a ban on fishing activities during the turtle mass nesting. There is no proper estimate on the effect of these changes on the incidental mortality of sea turtles.

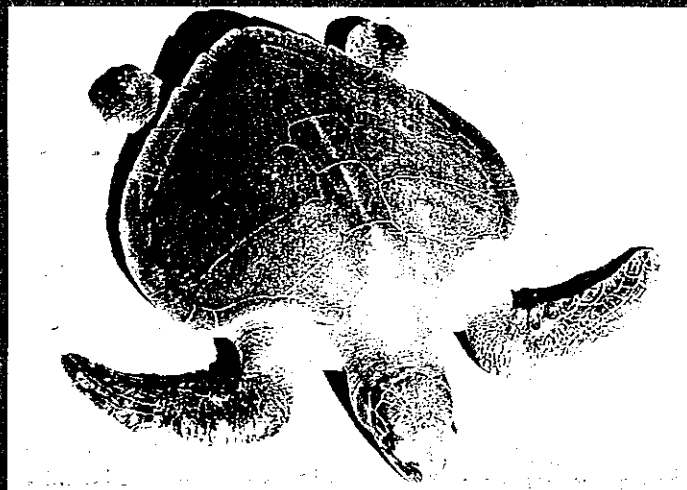
Considering this, the Ministry of Agriculture, Government of India constituted an expert scientific panel (vide Ref.No. 30035/36/97-FY(T I) dated 10<sup>th</sup> July,1998) to conduct a detailed study with the following terms of reference:

- (i) Distribution of sea turtle species in Indian waters;
- (ii) Incidental catch of sea turtles by trawl nets, dillnets etc.

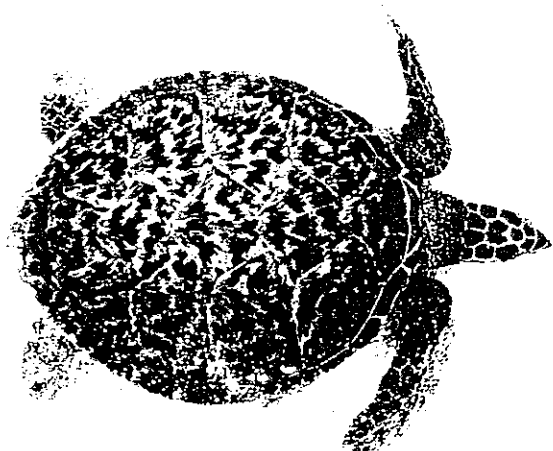
Plate 1. Five sea turtle species in Indian waters



*Dermochelys coriacea* (Leatherback turtle)



*Lepidochelys olivacea* (Olive ridley turtle)



*Dermochelys imbricata* (Hawksbill turtle)



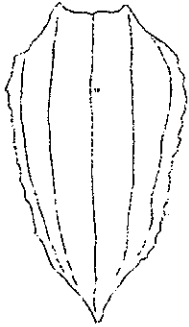
*Caretta caretta* (Loggerhead turtle)



Fig. 1

# IDENTIFICATION KEY

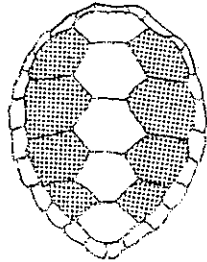
Carapace with  
- 5 distinct ridges  
- no large scales



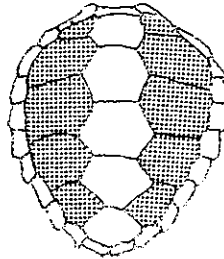
*Dermochelys coriacea*  
(Leatherback turtle)

Carapace with  
- no continuous ridges  
- large scales

4 pair costal scales

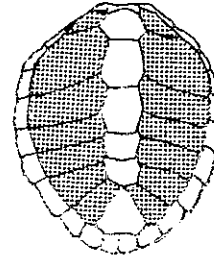


5 pair (rarely 6) costal scales  
- carapace longer than wide  
- colour red-brown to brown  
- no pores in scales of bridge



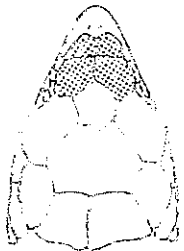
*Caretta caretta*  
(Loggerhead turtle)

6 pair or more costal scales  
- carapace approximately circular  
- colour grey green  
- pores in scales of bridge



*Lepidochelys olivacea*  
(Olive ridley turtle)

2 pair prefrontal scales  
- thick overlapping carapace scales



*Eretmochelys imbricata*  
(Hawksbill turtle)

1 pair prefrontal scales  
- no thick overlapping carapace scales

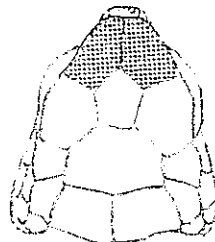


Table 1. Number of olive ridley nestings  
in Gahirmatha, Orissa from 1976-1999.

Year	Months	Number of nests
1976	Not available	1,50,000
1977	Not available	1,50,000
1978	Not available	2,00,000
1979	Not available	1,30,000
1980	Not available	2,00,000
1981	Not available	2,00,000
1982	No mass nesting	
1983	February	2,00,000
1984	January-March	5,00,000
1985	January-March	2,87,000
1986	April	48,000
1987	January-March	6,02,000
1988	No mass nesting	
1989	January	3,25,600
1990	March	2,58,000
1991	March-April	6,10,000
1992	January-March	3,21,700
1993	February	3,50,000
1994	March	2,00,000
1995	March	6,00,000
1996	January-March	2,00,000
1997	No mass nesting	
1998	No mass nesting	
1999	March	3,40,000

This species nests both in the east and west coasts of India, as well as in the Bay Islands.

*Chelonia mydas* (Green turtle)

This is the largest species found in the Indian waters. It occurs in the <sup>Gulf of Mannar,</sup> west and east coasts of India, Lakshadweep and Andaman and Nicobar Islands. The name Green turtle indicates the green colour of the fat. It is predominantly herbivorous and feeds on sea grass. This species was highly priced and there was a directed fishery for the green turtle in the 1970s in the Gulf of Mannar area.

Gulf of Mannar

*Eretmochelys imbricata* (Hawksbill turtle)

It is comparatively a small sized turtle and numerically less abundant in the Indian waters than the other species. It is reported from Lakshadweep, south west coast, Tamil Nadu and Andaman and Nicobar Islands. It feeds mainly on sponges, crabs and molluscs, As it frequently feeds on poisonous marine animals, the flesh of this species is often reported to be poisonous

*Caretta caretta* (Loggerhead turtle)

This species is reddish brown in colour and is characterized by a large head in relation to the body size. In India, it is recorded only from the Gulf of Mannar. It is a carnivore, feeding on crabs, fish and other benthic animals.

*Dermochelys coriacea* (Leatherback turtle)

Individuals of this species attain a weight of 500 kg. A thick leathery tissue covers the bones of the shells and hence the common name. Indiscriminate poaching of eggs in the 1970s caused the disappearance of this species in the

Table 2 Details of nesting of sea turtles

Species	Occurrence	Nesting area	Nesting season	Nesting intensity
Green turtle	Sporadic in Coastal mainland and A&N Islands	Gujarat (Kutch & Sourashtra)	-	Moderate
		Maharashtra (Thane)	July-Jan	Sparse
		Tamil Nadu (Gulf of manner&Palk Strait)		Sparse
		A & N Islands Lakshadweep	Nov-Jan June-Sep	Moderate Moderate
Hawksbill turtle	- do -	Tamil Nadu	-	Extremely low
		Andhra Pradesh	-	- do -
		Orissa	-	- do -
		Gujarat	-	Rare
		A& N Islands	Apr'-Jan	Moderate
		Lakshadweep	-	Rare
Leatherback turtle	- do -	Tamil Nadu	-	Very rare
		A & N Islands	Dec-Apr	Moderate
		Lakshadweep	-	stray
Loggerhead turtle	Tamil Nadu (sparse)	Not known	Not known	-
	Almost throughout the main land and Bay Islands	Gujarat	July-Sept	Moderate
Olive ridley turtle		Maharashtra	- do -	Stray
		Goa	- do -	Stray
		Karnataka	- do -	Stray
		Kerala	- do -	Stray
		Tamil Nadu	Dec-Feb	Moderate
		Andhra Pradesh	- do -	Moderate
		Orissa	- do -	Mass nesting
		West Bengal	- do -	Moderate
		A & N Island	- do -	Moderate

## Incidental Catch of Sea Turtles

A major threat which persists is the incidental catch of sea turtles in fishing gears like trawl and gillnet. Large number of live turtles, which are caught in the nets, are mutilated and removed from the nets and thrown out in the open sea to be washed ashore dead. The turtles caught in the gill nets drown and the carcasses are thrown out and washed ashore (Plates 5 and 6).

The Central Marine Fisheries Research Institute, (CMFRI) Cochin initiated a project 'Incidental catches of Turtles along Indian Coast', supported by MPEDA, Cochin for a period of 2 years during 1997 and 1998. With the financial assistance from the Ministry of Agriculture, Government of India, the CMFRI has continued to collect the incidental catches along the Indian coast during 1999. The programme of collection of data on the incidental landings/ stranding of turtles was initiated in January 1997 starting from the maritime state of West Bengal to Gujarat. The coastal length of each of the maritime state was divided into adjacent geographical zones grouping contiguous landing centres therein in a zone. The data were collected from each of these zones using a well designed statistical design. A zone consists of landing centres ranging from 10 to 25. From each zone 9 landing centres were selected at random and the observation made in these selected centres each month. Each centre was visited on two consecutive days 1200 hrs to 1800 hrs on the first day and 0600 by to 1200 hrs on the second day. Three clusters of two days were systematically selected from each 10 day period of a month and centres were randomly allotted to these selected cluster days.

In order to record the data collected two types of formats with definitions and instructions were designed and distributed. The data collection was attended to by the regular staff members of the CMFRI who are well experienced in field work and



strandings/ trapping of turtles of a state. Information gathered on nesting was also recorded.

The data collected by the CMFRI during the period January, 1997 to December 1998 on incidental catch of sea turtles along the Indian coast (barring Gahirmatha coast) indicated that the incidental catches of turtles were very rare and confined only to a few pockets of the peninsular region. Similarly stranding of turtles was very few and confined to a few maritime states. The state-wise estimated number of turtles landed/ stranded during 1997 is given in Table 3

Table 3. Sea turtle mortality (barring the mortality at Gahirmatha coast) during 1997 and 1998

State	Landed/trapped		Stranded		Total	
	1997	1998	1997	1998	1997	1998
West Bengal	Nil	28	96	97	96	125
Orissa	199	305	129	201	328	506
Andhra Pradesh	175	159	209	276	384	435
Tamil Nadu	1518	900	538	457	2056	1357
Kerala	270	182	4	Nil	274	182
Karnataka	Nil	Nil	10	Nil	10	Nil
Goa	24	Nil	Nil	Nil	24	Nil
Maharashtra	Nil	Nil	18	Nil	18	Nil

### **Mortality during 1997**

Of the estimated 3190 of turtles during 1997, about 70% belonged to landed/trapped category. The stranded ones contributed nearly one third (1004) of the estimated total. About 90% of the incidence of landing/ stranding of turtles occurred in the east coast and the rest in the west coast. Among the maritime states, incidences in Tamil Nadu was substantial, 66% of the total. On the west coast 85% of the estimated number occurred in Kerala. About 91% of the instances occurred in the east coast. The west coast accounted for only stray stranding, which occurred along the Kerala and Maharashtra coasts.

### **Mortality during 1998**

The estimated number of turtles during 1998 revealed that out of 2605, about 60% (1574) belonged to the landed/trapped category whereas 40% (1031) to the stranded category. Of the 1574 landed/trapped, a substantial number, 644 were released into the sea, bringing the actual number of landing to 930. This phenomenon was noticed in Orissa, Andhra Pradesh and Tamil Nadu during 1998. This was due to the awareness among the fishermen on the importance of sea turtle conservation.

The pattern of the incidental landing/trapping shows that 93% (2433) of the occurrences had recorded in east coast whereas along the west coast, only Kerala contributed the landings of 182 turtles. A close examination of the data pertaining to Kerala revealed that there was no occurrence of landing/trapping/stranding beyond the south of Kozhikode. There was no landing/stranding in Karnataka, Goa, Maharashtra and Gujarat. The incidence of trapping and release of turtles were

**Incidental catch in the mass nesting area:**

The number of dead olive ridley stranded in the Gahirmatha beach during 1983-1999 due to incidental catch is given in Table 4.

Table 4. Number of dead olive ridley stranded in the Gahirmatha beach due to incidental catch in fishing gears (source: CMFRI, Fisheries & Forest Departments, Orissa)

Year	Number
1983	7500
1984	392
1985	694
1986	531
1987	360
1988	422
1989	408
1990	Not available
1991	1000
1992	1500
1993	Not available
1994	5282
1995	1100

The annual incidental catch along the Gahirmatha coast ranged from 360 (in 1987) to 16,000 (in 1998). The turtles were washed ashore due to entangling in fishing operations conducted off Paradweep and adjacent fishing areas, the carcass drifting northwards and reaching the Gahirmatha beach. The morality was maximum during December - February and 87.5% the annual stranding was during this period (Table 5).

Table 5. Monthly variation in the stranding/incidental catch of adult olive ridley in Gahirmatha (source: Dept. of Forests, Orissa)

Month	% of stranded turtles
January	38.1
February	23.6
March	1.2
April	0.4
May	0.0
June	0.0
July	0.0
August	0.0
September	0.1
October	2.5

### **Study on mortality of sea turtles due to factors other than fishing**

Sea turtles are reported to have a long life span, perhaps up to 100 years. There is no direct estimation on the mortality of the sea turtles in the open sea due to causes other than incidental catches. However, the nesting population is known to be affected by the damages caused to the nesting habitat. The damage to the nesting habitat is caused by erosion and accretion, beach armoring, land mining, beach lighting, urbanization and oil spills. The recent super cyclone which hit the Orissa coast in October, 1999 is likely to have eroded or accreted the nesting beach, which may affect the mass nesting.