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## Incidental Catch of Sea Turtles Along the Indian Coast

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### Abstract

In recent years, there is concern on the large scale mortality of sea turtles due to incidental catch in fishing operations along the Indian coast resulting in conflict between conservationists and fishing communities. Along the Indian coast, 3190 and 2605 turtles were incidentally caught by fishing gears during 1997 and 1998, respectively. In addition to this, 5000 sea turtles, especially the olive ridley *Lepidochelys olivacea* were incidentally caught during the mass nesting months along the Orissa coast. Gillnets accounted for 60.1% of the catch and the trawls for 13.1% only. To reduce the mortality due to incidental catch, two options, namely closure of fishing during mass nesting period and attachment of Turtle Excluder Device (TED) to the trawl nets are suggested. The advantages and disadvantages of the options are suggested.

Key words: Incidental catch, sea turtle, Indian coast

### 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). Following the measures taken by the maritime state governments and the Government of India, exploitation of eggs and nesting females has reduced substantially. However, a major threat which persists is the incidental catch of adult turtles in fishing gears like the trawls and gillnets. Scattered information which are available on the incidental catch, especially off Orissa, indicate large scale mortality of sea turtles due to fishing operations (James *et al.*, 1989; Dash and Kar, 1990; Pandav *et al.*, 1994). In the absence of adequate information on the seasonal and gearwise catch on an all India basis, it is difficult to formulate policy to prevent the incidental catch. To overcome this, the Central Marine Fisheries Research Institute, Cochin collected data on the incidental catch in the fish landing centres along the coast of India. The data thus collected during 1997 and 1998 have been analysed and presented here.

### Material and Methods

The coast of each maritime state was divided into zones of contiguous fish landing centres. From each zone, 9 landing centres were selected at random. Each centre was observed on two consecutive days; 1200 to 1800 hrs on the I day and 0600 to 1200 hrs on the II day. Three clusters of

two days were selected from each 10 day period of a month and the centres were randomly allotted to these selected cluster days.

On each observation day, the number of live turtles landed/trapped alive by the fishing gears and the dead turtles stranded in the landing centres were recorded. Further, inquiries on the number of turtles landed/trapped and stranded were made from the fishermen for the period between two adjacent observation days in each landing centre. These data were processed and the number of turtles landed/trapped alive and stranded were estimated for each zone and subsequently for each state.

### Results

A total of 3190 and 2605 turtles were incidentally caught (landed/trapped and stranded) along the Indian coast (barring the Gahirmatha coast, Orissa, where mass nesting occurs almost every year) during 1997 and 1998, respectively (Table 1). About 65% of the turtles (3760) were landed/trapped alive and the remaining (2035), which died during fishing operations, were discarded by the fishermen and were stranded ashore. The incidental catch was higher (90 to 93%) along the east coast than that along the west coast. The incidence was high particularly along the Tamil Nadu coast. In the west coast, the incidence was negligible along the Karnataka coast and further north.

Of the 3760 landed/trapped turtles along the Indian coast during 1997 and 1998, about 60% was caught by gillnets operated either from mechanised or artisanal craft

**Table 1. Sea turtle mortality (barring the mortality along Gahirmatha coast) during 1997 and 1998**

State	Landed/trapped		Stranded		Total	
	1997	1998	1997	1998	1997	1998
West Bengal	0	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	0	274	182
Karnataka	0	0	10	0	10	0
Goa	24	0	0	0	24	0
Maharashtra	0	0	18	0	18	0
Gujarat	0	0	0	0	0	0
Total	2186	1574	1004	1031	3190	2605

(Table 2). The trawls and seines accounted for only 13.1% and 4.2%, respectively. Other gears such as bag-net, stake-net and hooks & line caught 22.6%. As the stranded turtles were dead and washed ashore, the gear responsible for the stranding was not known.

**Table 2. Percentage of turtles landed/trapped in different gears during 1997 and 1998**

State	Trawl	Gillnet	Seine	Other gears
West Bengal	0.0	0.0	0.0	100.0
Orissa	13.9	64.7	0.0	0.0
Andhra Pradesh	27.5	34.7	32.3	21.4
Tamil Nadu	2.8	72.5	1.7	5.5
Kerala	58.7	7.7	0.0	23.0
Karnataka	0.0	0.0	0.0	33.6
Goa	0.0	50.0	50.0	0.0
Maharashtra	0.0	0.0	0.0	0.0
Gujarat	0.0	0.0	0.0	0.0
Total	13.1	60.1	0.2	22.6

Month-wise incidental catch along each maritime state during 1997 and 1998 is given in Table 3. Maximum catch (65.7% of the annual catch) was observed during the

**Table 3. Month-wise incidental catch of sea turtles during 1997 and 1998**

Month	West Bengal	Orissa	Andhra Pradesh	Tamil Nadu	Kerala	Karnataka	Goa	Maharashtra	Gujarat	All India No.	%
January	74	241	282	356	90	10	0	0	0	1053	18.5
February	103	318	229	943	89	0	0	0	0	1732	30.4
March	16	68	92	691	79	0	12	0	0	958	16.8
April	0	0	24	772	28	0	0	0	0	824	14.5
May	0	4	17	163	23	0	0	0	0	207	3.6
June	0	5	0	75	36	0	0	0	0	116	2.0
July	0	0	0	30	8	0	0	0	0	38	0.7
August	0	7	5	29	12	0	0	0	0	53	0.9
September	0	0	7	15	10	0	0	0	0	32	0.6
October	0	13	9	66	24	0	12	18	0	142	2.5
November	9	34	38	41	12	0	0	0	0	134	2.4
December	19	144	66	132	46	0	0	0	0	407	7.1

1st quarter (January to March). This trend was observed in all the maritime states along the east coast and in Kerala.

With regard to species, along Tamil Nadu coast olive ridley (57%), loggerhead (22%), green turtle and hawksbill (21%) were noticed in the incidental catch. The species observed along Orissa coast were olive ridley (92%), green turtle (6%) and loggerhead (2%). Along the Kerala coast olive ridley (76%) and green turtle (24%) were noticed.

The number of dead olive ridleys stranded along the Gahirmatha beach during 1983-1999 is given in Table 4.

**Table 4. Number of olive ridley stranded along the Gahirmatha beach**

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
1996	1200
1997	5000
1998	16000
1999	9047

Source: CMFRI; Fisheries and Forest Departments, Orissa

The annual stranding ranged from 360 in 1987 to 16,000 in 1998. The turtles were dead and washed ashore either due to entangling in fishing gears or due to hit by propeller of

the vessels which operated off Paradeep and adjacent fishing areas. The mortality was maximum during the mass nesting months of December-February and 87.5% of the annual stranding was during this period.

## Discussion

The incidental catch of sea turtles was high along the east coast due to congregation and high nesting activity along the east coast than that along the west coast. Barring the Gahirmatha coast, the maximum catch was observed off Tamil Nadu. The Tamil Nadu coast is known to be a dense nesting area, especially of the olive ridley, next only to the Gahirmatha coast (Silas *et al.*, 1983). Moreover, the fishing activity off Tamil Nadu is intense and hence, the probability of the nesting adults encountering fishing gears is high, resulting in high incidental catch off Tamil Nadu.

The observation of seasonal incidental catch in different gears provides useful information for evolving suitable management measures for reducing the turtle mortality. It is generally believed that introduction of Turtle Excluder Device (TED) in the trawls would effectively reduce the incidental catch (Frazier, 1980). However, the present observation that the trawls account for only 13.1% of the landed/trapped turtles, apprehends the usefulness of the TED in reducing the catch. Rajagopalan *et al.* (1996) also reported that the trawls accounted for only 17.8% of the incidental catch and the gillnets as high as 76.5% along the Indian coast during 1985-1995. As there is no effective mechanism to prevent turtles being caught by the gillnets (which account for 60.1% of the incidental catch during 1997-1998), the only possibility appears to be a fishing ban of the areas of intense nesting. At present, there is no effective fishing ban along the east coast but the maritime state governments are seriously considering seasonal fishing ban for mechanised vessels. The intense season of nesting, the months of high incidental catch and the peak season of fishing coincide during December - March. Hence, ban on fishing during the peak nesting season of the turtles may not be acceptable to the fishermen. This factor

has to be given due consideration by the governments while formulating regulatory measures on fishing.

The annual average incidental catch of sea turtles during 1997-1998 (barring the mass nesting area along the Gahirmatha coast) was about 2900. In the absence of information on the stock size of the sea turtle population along the Indian coast, it may not be possible to assess the extent of damage the incidental catch may cause to the stock. A proper assessment of the total stock is required, which would be helpful for formulating fishery management measures without affecting the livelihood of about 5 million marine fishermen, who are directly and indirectly involved in fishing.

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