NOTE ON SEA-TURTLE SITUATION IN INDIA

Five of the seven species of sea turtles found world wide are reported to occur in the Indian coastal waters and the Bay Islands (Kar and Bhaskar, 1982). These are the olive ridley (*Lepidochelys olivacea*), green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*) and loggerhead (*Caretta caretta*). Except for the loggerhead, the remaining four species nest in the Indian coast line (**Kar and Bhaskar, 1982**).

Olive ridley is the most numerous among the sea turtles found in India and is well known for its *arribada* or annual mass nesting, when thousands of turtles migrate to the breeding ground to mate and nest simultaneously. **Of the few such mass nesting beaches left in the world today, India has three. A significant proportion of world's olive ridley population migrate every winter to the Indian coastal waters for nesting at the three mass nesting beaches located in Orissa as well as along other parts of Indian coast**. The beaches of Andaman and Nicobar Islands harbour some of the important nesting grounds for green, hawksbill and leatherback sea turtles. The coral reefs of Lakshadweep are important feeding grounds for hawksbill sea turtle (see Table 1.

Table – 1

	Species Recorded	Nesting Confirmed	Known nesting beaches
WEST COAST (Gujarat, Maharashtra, Goa, Karnataka and Kerala	Green turtle, Olive ridley and Leatherback	Olive ridley and Green	Gujarat : Mandvi in Kutch, Sea beach between Okha and Okha Madhi, Bhaidar, Beyt, Nora and Chank Islands. Maharashtra : Olive ridley nest near Gorai, Kihim, Manowrie and Versova.
EAST COAST : (West Bengal, Orissa, Andhra Pradesh and Tamil Nadu)	Olive ridley, Green, Hawksbill, Leatherback and Loggerhead	Olive ridley	Tamil Nadu : Nest in Gulf of Mannar, Point Calimere, and 50 km coast line south of Madras. Andhra Pradesh: Kakinada coast, sea beach near the mouth of Godavari and Krishna and near Visakhapattanam Orissa : All along the coast south of Dhamra river mouth. Two mass nesting beaches at Gahirmatha and Rushikulya. West Bengal : In the sandy beaches of Sunderbans.
INLANDS : (Andaman & Nicobar Islands and Lakshadweep)	Olive ridley, Green, Leatherback, Hawksbill and Loggerhead	Olive ridley, Green, Hawksbill and Leatherback	Great Nicobar, Little Andaman, Rutland, Middle Andaman, Katchal, South Sentinel, south Reef and Teris Islands.

All the five species of sea turtles that occur in Indian coastal waters are legally protected being included in Schedule I of the Indian Wildlife Protection Act (1972), as well as listed in Appendix I of Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES) which prohibits trade in turtle products by signatory countries. At present there exists no commercial or international trade of marine turtles or turtle products in India.

CURRENT STATUS AND PROBLEMS

Inspite of the legal protection given to all the sea turtle species in India, in recent years the sea turtle population migrating to Indian waters are on the decline. Several thousand adult breeding individuals die every year along the Indian coast line which has become a major concern of national and international community (**Pandav et al 1997 & Pandav & Choudhury, 1999**). **The repercussions of such large scale mortality of a globally migratory species group has had its reflection at the W.T.O., where India had to contest a ban that was imposed on export of marine products as a result of sea turtle mortality**.

The small scale research, conservation and management effort of sea turtles in India which dates back to mid 1970's culminated in the mid 80's with the active participation of Indian Coast Guard and Navy in sea turtle protection. However, the sea turtles which spend almost six months along the Indian coast line, both off-shore as well as on-shore, face a multitude of problems which needs to be seriously looked at.

The major problems that sea turtles face in Indian coast line are:

I. Incidental capture in fishing nets: Near shore mechanised fishing within 5 km from shore line results in the mortality of large number of sea turtles along the Indian coast every year. More than 5,000 dead olive ridley sea turtles were counted along 480 km long Orissa coast during a six month survey in 1994 (Pandav *et al.* 1994). The ongoing research programme of WII documents a three fold increase in this number during 1997-98 along the same stretch. These deaths were due to accidental capture in trawl nets. However, details of the incidental capture of marine turtles in fishing nets along rest part of Indian coast are yet to be documented.

II. Loss of nesting habitats: Developmental activities very close to the identified coast identified line such as construction of roads, tourist resorts and aquaculture projects result in the loss of nesting habitats. Besides this, plantation of Casuarina very close to some of the major sea turtle nesting beaches along the Indian coast has resulted in drastic decline of the nesting population. Plantation of Casuarina near the sea turtle nesting beaches reduces the

space available for the sea turtles to nest and once the Casuarina grows up, it changes th beach topography with its litter deposition and root growth, rendering the beach unsuitabl for the turtles to nest (Pandav *et al* 1994).

Further, the CRZ notification which is supposed to protect nesting sites of not only turtles but other marine life breeding along the coast, does not include sites presently, an historically known to have been breeding grounds, as CRZ-I. There are no legal guidelin that could be discussed among the concerned authorities and human populations that liv and use coastal resources of these areas to develop a proper Coastal-non forested are protection programme.

III. Non-human predation: A significant proportion of sea turtle nests laid along th Indian coast are subjected to heavy predation. Studies on the population dynamics of th olive ridley at Gahirmatha rookery along northern Orissa coast have indicated that a larg percentage of eggs laid during a particular nesting season are destroyed (**Dash and Ka 1990**). This results from a number of factors such as destruction of nests by subsequentl emerging nesting females during an arribada, nest destruction by non-human predators suc as wild pigs, jackals, feral dogs etc. and by beach erosion (**Pandav et al. 1994**). Non-huma predation is a matter of great concern in case of sporadic nesting species. Non-huma predators such as feral dogs and Andaman wild pigs cause a considerable damage to th nests of leatherback, green and hawksbill turtles nesting in Andaman (**Bhaskar 1993**).

IV. Artificial illumination: Many of the major sea turtle nesting beaches in India are no subjected to bright illumination. Artificial illumination because of developmental activitie near nesting beaches has resulted in mis-orientation of nesting sea turtles as well as sea turtl hatchlings leading to heavy hatchling mortality (**Pandav et al 1998**).

TURTLE EXCLUDER DEVICE AND SEA TURTLE

Turtle Excluder Device (TED) is a simple mechanical device that is fitted to a trawl ne The TED allows a sea-turtle trapped in a trawl net to escape but allows the fish to remai in net. The TED was developed in USA and many maritime countries have now made mandatory for fishing trawlers to use TED.

Fisherfolk in India, however are reluctant to use TED as they fear, they will also los some percentage of fish catch. Further there has been no proper demonstration an extension of TED at grass root level to fisherfolk community.

The Central Marine Fisheries Institute (CMFRI) and Central Institute of Fisherie Technology (CIFT), Cochin has fabricated indigenous TED, which are still to be teste and certified. The Agriculture Ministry, Govt. of India has formed an Expert Scientifi Panel to finalize use of TED in trawl nets to safeguard turtles.

ILLEGAL FISHING IN ORISSA COAST :

The 480 km coast line of Orissa is a major marine fishing area. The Govt. of Orissa ha promulgated the Orissa Maritime Fishing Act which prohibits mechanized fishing vessel to operate within 5 km from the coast. The Act also safeguards the Orissa coast fro being illegally fished by fishermen from other states. However, illegal fishing continue both in no fishing zone as also by fishermen from other regions particularly from We Bengal and Andhra Pradesh.

COASTAL ILLUMINATION :

The electric illuminations closer to the coast has a major impact on the sea-turtles nestin and also disorientation of hatchlings after hatching. The coastal developments close t the shore therefore poses a big problem. At the major sea-turtle nesting site in Orissa, the Gahirmatha coast, the D.R.D.O. facilities posed some problem initially. However, with MoEF's intervention the D.R.D.O has now stopped illuminating their facilities during the nesting and hatching season.

THE CONSERVATION AGENDA OF PROJECT SEA TURTLE, GOVT. OF INDIA

The 7,100 km coastline of India, with its high human population density and their marine and coastal onshore resource dependency makes it difficult to develop a conservation management strategy for the sea turtle which shares the marine habitat with innumerable number of exploitable species. However, considering the fact that Indian coastal environment, both off-shore and on-shore, harbour almost 30-40% of world's sea turtle population, the MoEF, Govt. of India has launched a national level PROJECT SEA TURTLE.

THE GOI/UNDP SEA-TURTLE PROJECT :

The Ministry of Environment & Forests (MoEF), Govt. of India has initiated the Sea-turtle conservation project primarily to safeguard the Olive Ridley Sea-turtle in Orissa and east coast of India. The project also aim to initiate action in other coastal states.

In the first phase, all marine turtle nesting and breeding location along Indian coast are being surveyed to provide informations to the protecting agencies including the fisheries, coast guard and wildlife authorities.

This will be followed by developing conservation action in which local communities and other official departments will be involved.

The project is for a period of two years and is planned to be extended for a longer period.

The protection and conservation of sea-turtles will however require a co-ordinated planning and action by Ministry of Environment & Forests, Agriculture Ministry, Ministry of Commerce and Ministry of Social Welfare.

The MoEF has provided financial assistance to Orissa to patrol the sea-turtle congregation sites both on shore and off-shore. These coast guard has been patrolling the breeding congregation areas during the breeding season.

SEA TURTLE RESEARCH IN INDIA :

- Initiated in 1975 by Dr. H.R. Bustard with the discovery of Gahirmatha rookery in Orissa. This was then followed by the doctoral research of Chandra Sekhar Kar at the same rookery from 1978 to 1983. The Orissa Forest Department tagged 15,000 olive ridleys during this period at Gahirmatha and the results of this study are published in Dash and Kar (1990).
- Tagging and monitoring of stranded turtles along the Gahirmatha coast by the Central Marine Fisheries Research Institute (CMFRI), Cochin during 1983 and 1987. The results of these studies have appeared in the bulletins of CMFRI.
- Studies on temperature dependent sex determination in olive ridley eggs from the Gahirmatha rookery were carried out in the Utkal University, Bhubaneswar, Orissa during 1985 and 1990.
- Tagging studies on leatherback, hawksbill, green and olive ridley were carried out in Andaman and Nicobar Islands during 1990 and 1993 by Satish Bhaskar from the Madras Crocodile Bank Trust (MCBT). A report on this work has been published by the MCBT.
- A status survey of olive ridley sea turtle and its nesting habitats along the Orissa coast was carried out by the Wildlife Institute of India (WII), Dehradun during November, 1993 and July, 1994. A report based on this work has been published by the WII (Pandav et al. 1994).
- The Wildlife Institute of India initiated a five year tagging and monitoring programme of sea turtles in Orissa in December 1994. As part of this programme 15,000 ridleys have been tagged in Orissa. The research programme has also documented the death of more than 45,000 adult olive ridleys in Orissa in last five years (1994-99).
- A study on status, ecology and management of olive ridley sea turtle and their nesting habitats along north coastal Andhra Pradesh was carried out by K.V. R. Priyadarshini as part of the World Wildlife Fund's conservation Crop Volunteer programme.
- A study on the ecology of green turtle has been initiated by the CMFRI in 1998 and the work is in progress.

- A study on the conservation genetics of olive ridley along the east coast of India was initiated by WII in February, 1999 and the work is in progress.

RESULTS OF WII'S SEA TURTLE TAGGING AND MONITORING PROGRAMME IN ORISSA :

- 3,326 olive ridleys (1,690 males and 1,636 females) have been tagged in the coastal waters of Gahirmatha over three breeding seasons (1997-99).
- Nearly 12,000 nesting ridleys have been tagged at five sties including the three rookeries and two sporadic nesting beaches in Orissa.
- So far, there has been six recoveries of tagged turtles outside the coastal waters off Orissa. Four of the recoveries are from the eastern coast of Sri Lanka and two from the coastal waters of Tamil Nadu.
- 260 turtles have been recaptured in the coastal waters as well as in the nesting beaches over the last two breeding seasons (1997-98 & 1998-99) in Orissa.
- There have been nine recaptures of turtles while exchanging their nesting beaches in Orissa. The range of inter rookery movement varies from 35-220 km.
- 76 of these tagged turtles have been found dead along the Orissa coast during 1998-99.
- During 1993 and 1999 the death of 46,219 olive ridleys have been documented in Orissa.

Year	Gahrimatha	Rest of Orissa
1993-94	2,153	3,129
1994-95	2,162	1,500
1995-96	2,244	2,400
1996-97	3,654	2,800
1997-98	3,544	10,031
1998-99	5,198	7,404
Total	18,955	27,264