## Orissa Coastal Management Initiatives: Protection of Nearshore Fishing Areas and Turtle Breeding Ground Through the Deployment of Artificial Reef Units

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Olive ridley turtles (*Lepidochelys olivacea*) exhibit a unique behavior, mass nesting, or 'arribada' in only a few places in the world. Along the coast of Orissa, there are three known mass nesting beaches at Gahirmatha, Rushikulya and Devi mouth..

Over the past five years, more than 75,000 olive ridley turtles have washed up dead along Orissa's coastline, which has coincided with an increase in shrimp trawling. The sea turtle is acknowledged to be an indicator species and its rapid annihilation is indicative that many other species are at risk as well. Artificial reefs have been shown to protect inshore coastal areas from shrimp-trawlers who are capturing the turtles and other species as 'incidental catch'. The inshore coastal areas of Orissa are already protected legally by a series of laws intended to support local fishermen. These include the Orissa Marine Fisheries Regulation Act (1982) and Rules (1983) which prohibit mechanised fishing within a distance of 10 km from the shore. Although laws are in place, the local government enforcement agencies do not currently have the means to consistently patrol and prosecute offenders of these laws. Artificial reefs provide protection from trawlers entering into protected areas. In Orissa, the major turtle concentrations are off the coast of Gahirmatha and Devi mouth. In fact, studies have shown that most of the turtles near Gahirmatha are found within an area of 50 square kilometres (Ram and Pandav, 2001).

In addition to protecting designated areas from intrusion of trawlers into illegal territory, the presence of artificial reefs may increase both the variety and number of fish which inshore local fishermen depend on for their livelihood. In fact, from experience with artificial reefs in Kerala, it is recommended that local authority should prepare guidelines or proposed laws regarding ownership and exploitation rights to manage increased fishing activity in artificial reef areas.

In an ongoing project in Malaysia, it is believed that the number of deaths by incidental catch of marine turtles in some areas has been greatly reduced by using artificial reef balls. This is a compelling example of a possible intervention that could support conservation efforts in Orissa as well as protect and support rural livelihoods for coastal residents. The role and use of artificial reefs in turtle conservation was discussed by many researchers and government representatives at the workshop for the development of a national sea turtle conservation action plan, April 9-10 2001, Bhubaneshwar, Orissa conducted by the Forest Department, Govt. of Orissa, and Wildlife Institute of India, Dehradun. However, there are currently no available funds for supporting artificial reef construction along the Orissa coast.

Here, I propose a conservation and management initiative for sea turtles in Orissa, focusing largely on education and awareness programmes for local communities, including a test site for artificial reefs as one component. It must be stressed that, while artificial reefs may be useful, they are only likely to work over small areas and careful evaluation has to be carried out before any programmes are implemented.

***Key components of the programme***

1. Chemical and physical surveys of proposed sites for Artificial Reefs (Institutes such as School of Oceanography, Indian Institute of Technology, Madras and National Institute of Oceanography should be able to assist)
2. Survey of current fishery activities and practices (local offshore fishing, fish farming, trawlers operating in the area)
3. Selection of site for trial artificial reef units, based on surveys. (Gahirmatha or Devi River mouth.)
4. Decisions to be made: a) On materials used to make AR block, b) Design of blocks to be constructed, c) Where and how reef blocks are to be produced, d) Area covered with AR blocks and e) Patterns of deployment.
5. Construction of reef blocks and deployment off shore.

6. Awareness/Education
   a. Awareness campaign in local media about existence of artificial reefs; Where are they? and Why are they there?
   b. Use of newspapers, magazines, radio, billboards
   c. Experience in Malaysia demonstrated that 50% of the artificial reef success is achieved through awareness in local media
7. Sponsoring a series of local town meetings, inviting all stakeholders for Question-and-Answer sessions and producing handouts and media releases, which are based on concerns aired in these meetings. For:
   i. trawlers
   ii. fishermen
   iii. local authorities
   iv. residents
   v. educators and students
8. Introduction of primary and secondary curriculum supplements and materials to schools in coastal region. A booklet and a package of teaching aids used in delivery of educational activities about turtles and other coastal resources nearby in order to promote local environmental awareness and encourage discussion of strategies for protection and management. Education of school children is a means of ensuring that future generations have the skills to engage in discussion and democratic decision making on these issues.
9. Continued studies and surveys to assess the impact artificial reefs have on physical environment, fish populations, turtle breeding habits and mortality rates.

In summary, artificial reefs would deter trawl fishing and would have a positive impact on artisanal fishing. While they might not be the single magical solution to conserving sea turtles in Orissa, they could provide a much needed alternative to labour intensive enforcement in selected areas.

***References***

RAM, K. & B. PANDAV (2001) Reproductive biology of the olive ridley sea turtle in Gahirmatha, Orissa. 21st Annual Symposium on sea turtle Biology and Conservation. Philadelphia. USA.

## Some Notes on the Olive Ridley Sea Turtle from the Fishery Desk, West Bengal

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The migration of Olive Ridley turtles to West Bengal for nesting has been documented. The coast of West Bengal extends from Sundarbans to Midnapore district. The turtles prefer the islands for nesting.. This region is characteristised by abundant food, favourable ecosystems with creeks, canals, lagoons, luxuriant forest of mangrove vegetation and sandy beaches. Olive Ridley turtles are found in the coastal areas of the Sundarbans where they nest in small numbers. During the visit to different islands of Sundarban, viz., Bijera, Kalas, Jambudwip & Marichjhanpi, turtles were found in Bijera and turtle nests were found in Kalas and Jambudwip. Turtles were also found nesting at Kedurdeep, Hansaraj in Sundarbans.

Olive Ridleys are abundant in the Bay of Bengal near the coast of Midnapore. From the region known as 'Military boya' to Dhamra of Orissa, from November till the 1st week of January. From February onwards their presence starts to diminish in Shankarpur coast.

Trading of different types of sea turtles has been documented at many places in the maritime districts. Turtles are hauled along the coastline from Kakdwip towards Midnapore district and landed at Babasahed ghat at Rasulpur and Petuaghat. These hauls never land at Digha or Shankarpur area to avoid guards. The meat of turtle are sold at interior markets viz., Sopna, Chowrangee in Contai sub-division. With an aim to conserve sea turtles, the Fishery Department, Government of West Bengal issued an order regarding introduction of TED in the mechanised trawlers.

A trematode *Parangiodictyum satyabrati* was isolated by the author from a marine turtle *Chelonia mydas* from the coast of Orissa