

# Status of sea turtle conservation in India and the way forward

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## Abstract

Sea turtles play an important role in maintaining the balance of the food web in the marine ecosystem. It is reported that the unintentional capture of turtles in shrimp trawls is the most important factor leading to the mortality of sea turtles. Globally, several conservation measures are in place for conserving populations of the iconic sea turtles. This includes India where several identified turtle nesting sites are protected through appropriate restrictions on fishing and other anthropogenic activities. The history of conservation of sea turtles in India and recent linking use of Turtle Excluder Device (TED) in shrimp trawls to shrimp imports by the USA, is discussed.

*Keywords: Sea turtles, conservation, Turtle Excluder Device, shrimp trawls*

## Introduction

Five species of marine turtles viz., Olive Ridley turtle (*Lepidochelys olivacea*), Loggerhead turtle (*Caretta caretta*), Leather back turtle (*Dermochelys coriacea*), Hawksbill turtle (*Eretmochelys imbricata*) and Green turtle (*Chelonia mydas*) are known to inhabit the Indian coastal waters. Government of India has given high priority to conserve the sea turtles and all the five species are protected as they are placed in Schedule I of the Indian Wildlife (Protection) Act 1972 as per the Amendments made to the Schedule in September 1977. Sea turtles are venerated in Hindu mythology and those accidentally caught are usually released back into the sea by the local fishermen. In South India, majority of the coastal people believed that turtles are bad omens and cannot be brought into the house. Likewise, turtle meat consumption is forbidden among muslims while only certain christian and tribal communities in India are not averse to consuming their eggs and meat. Thus, socio-religious importance for turtles in India goes a long way in the implementation of conservation measures.

The Government of India constituted an Expert Scientific Panel (ESP) on 10 July 1998 to conduct a study on the distribution of sea turtles, their incidental mortalities in fishing nets, use of TED in fishing waters, etc. which submitted its report in March 2000. Two important recommendations made by ESP were: (i) declaration of mass nesting areas as marine sanctuaries, and (ii) mandatory implementation of turtle excluder devices (TEDs) in all mechanized trawlers operating in areas of mass nesting where incidental mortalities have been recorded, in order to bring down incidental catch and mortality of sea turtles. It identified both the areas and the period as follows:

- I. Entire coast of Odisha during the period from November to April,
- II. Coast of Midnapore District in West Bengal during December-March,
- III. Coast of Srikakulam, Vizianagaram, Visakhapatnam and East Godavari districts in Andhra Pradesh during November-April,
- IV. Coast of Nagapattinam, Tuticorin, Ramanathapuram and Tirunelveli districts in Tamil Nadu during December-April,

- V. Coast of Puducherry, excluding areas off the coast of Mahe, Karaikal and Yanam, during December-April, and
- VI. Coast of Kollam and Trivandrum districts in Kerala, during December-March.

Marine Product Export Development Authority (MPEDA) was entrusted with the responsibility of the development and promotion of TED designed by ICAR-Central Institute of Fisheries Technology (CIFT).

Laws that govern marine turtle conservation in India include

1. Wildlife (Protection) Act - 1972
2. Ratification of the CITES - 1976
3. Ratification of Bon Convention - 1981
4. Environment (Protection) Act - 1986
5. The Biological Diversity Act, 2002
6. The Wildlife Protection Amendment Act- 2002
7. The Marine Fishing Policy, 2004
8. Marine Fisheries (Regulation and Management) Bill, 2009
9. Coastal Regulation Zone Notification, 2011
10. State Fisheries Policies and Laws

## Conservation and Management measures on East Coast of India

**West Bengal:** Marine Fishing Regulatory Act was implemented in the year 1993. Fishing craft fitted with more than 30 hp engine are allowed to operate beyond 18 km. Trawl net of standard mesh size fitted with turtle excluder devices is mandatory. Incidental catch of Olive ridley was reported in the gillnet fishing at Digha the months of December-February. Fishermen used to release it immediately due to the strict legal action taken by the forest department. In 1982, the West Bengal Government enforced the Indian Wild Life Act, 1972 (Amendment, October '77).

**Odisha:** The Green sea turtle has been reported to occur during summer in the outer channel (river mouth area) of the Chilka lake, a brackish waterbody. The mass nesting beach (rookery) along the Chilika coast is at Rushikulya which is located in southern Odisha. Half of the world's Olive Ridley turtle population and 90% of India's turtle population lives in this state. Every year between October and April, three major nesting sites:- the Nasi Islands in Gahirmatha, the Devi river mouth and the Rushikulya river mouth in Odisha becomes the nesting

ground for Olive Ridley Turtles. The coastal belt was also notified as the Gahirmatha (Marine) Wildlife Sanctuary in 1997, in order to protect the Olive Ridley sea turtles. Bhitarkanika gained the status of a wildlife sanctuary in 1975 and national park in 1998, due to its ecological significance. For the protection and conservation of Olive Ridley turtles, there has been a ban on fishing for a period of seven months (November 1 - May 31) every year, applicable to a 20-kilometre radius from the coast and enforced by the forest department to protect the endangered turtles, under the Orissa (Odisha) Marine Fishing Regulation Act, 1982 and Marine Fishing Rules, 1983. All these restrictions amount to a loss of ₹1000 million to the fishing industry and to the fishermen involved in fishing. The state fisheries department offers affected families subsidised rice rations for up to six months as a form of compensation. Odisha government has also proposed to enhance the livelihood support assistance from ₹ 5000 to ₹ 7500 to each fishermen family during the ban period. In Odisha, it is legally mandated that trawlers use TEDs. Odisha government also promotes turtle tourism which in turn could help conserve Olive Ridley turtles. It is reported that during 2017-18 around 11.10 lakh Olive Ridley turtles emerged from the sea to lay eggs along Odisha coast. The 'Operation Oliva' mission launched by the Indian Coast Guard and the 'Sea Turtle Research Centre' near the Ghati Central Nursery in the Khalikote forest range of Ganjam district set up the Odisha government for the conservation of Olive Ridley turtles are other initiatives.

**Andhra Pradesh:** Mypadu a fishing village in Nellore district is one of the sporadic nesting sites with less than 10 nestings of Olive Ridley turtles. The state government is promoting tourism in the beach. Trammel net ('Disco net') used to catch shrimp particularly *Penaeus indicus* by the artisanal fishermen occasionally trapped juvenile Olive Ridleys and caused much damage to the nets. Presently, fishermen are avoiding the place where turtles are found and entangled juvenile turtles are also immediately released back to the sea to prevent damage to nets. ICAR-Central Marine Fisheries Research Institute (CMFRI) which extensively studied the trawl by-catch in Andhra Pradesh during December 2013 to December 2014 reported that bycatch of turtles in trawl net was < 0.5%.

As per the Andhra Pradesh Marine Fishing Regulation Act, 1994 trawlers are mandated to use TED and the shrimp trawlers fishing without Turtle Excluder Device (TED) shall be liable for confiscation of entire catch

and impose a fine of ₹ 2500. Andhra Pradesh Forest Department and NTPC Ltd jointly initiated the 'Sea turtle Conservation Project' under the 'Corporate Social Responsibility and Sustainable Development Initiative'. Community Based Sea Turtle Protection and Conservation Programme has been taking place for the past 21 years jointly by Andhra Pradesh Forest Department and Visakha Society for Protection and Care of Animals to protect and conserve the sea turtles. Village level sea turtle protection committees are constituted at each Nesting Beach Zone for the protection of nesting turtles, nests, eggs and hatchlings.

**Tamil Nadu:** According to the Tamil Nadu Marine Fisheries Regulation Act of 1983 (Tamil Nadu Act: 8 of 1983), fishing by mechanized fishing vessels, motorized country craft and those using mechanized fishing techniques within a 5 nautical mile (nmi) radius around the identified potential nesting and breeding sites of sea turtles is prohibited. In Tamil Nadu, the Olive Ridley nests between December and April along the Chennai-Kancheepuram coastline. In January 2015, a newspaper report on 35 sea turtles washed ashore along the Chennai - Pulicat coast was considered a *suo motu* PIL by the Madras High Court, directing the Secretary to Government, Fisheries Department and the Commissioner of Fisheries, to take action against erring fishermen and ensure safe living of sea animals including sea turtles. Accordingly, on September 30, 2015, the Tamil Nadu Fisheries Department amended the state's Marine Fishing Regulation Rules, 1983 and included the following clause: "(d) No trawl net shall be used without fixing Turtle Excluder Device (TED). In September 2016, the Tamil Nadu government announced the prohibition of fishing by any kind of fishing vessels in a radius of five nmi [approximately nine km] around potential nesting and breeding sites of sea turtles, called as the Tamil Nadu Marine Fishing Regulation (Amendment) Act, 2016. Following this, Department of Fisheries issued a government order (GO) in September 2016, identifying over a 100 potential Olive Ridley nesting sites and prohibiting fishing using any mechanised or motorised crafts within five nmi of these sites for four months (January to April). Forest department has also set up turtle hatchery in Chennai coast for implementing conservation measures involving NGOs and students.

**Puducherry:** The coastline of Puducherry is used as a migratory route by Olive Ridley turtles and the stretch between Nallavadu and Moorthykuppam in Puducherry and the Arasalar beach in Karaikal have been identified

as important nesting sites. In 2018, Puducherry forest department personnel and several volunteers managed to collect 11500 eggs, the highest in the last 15 years and around 7000 turtle hatchlings were released in November.

## Conservation and management measures on West Coast of India

**Kerala:** Kuzhupilly beach located in the Vypeen island of Ernakulam district has several areas of backwaters where three species of Terrapins i.e Leith's softshell turtle *Nilssonina leithii*, Indian black turtle *Melanochelys trijuga coronata* and Indian soft-shelled turtle *Lissemys punctata punctata* are reported to occur. However, sea turtles are not at all sighted in Cochin backwaters. The number of turtles nesting along the Kerala coast is also very less. Sea wall covers about 70% of the state's coastline and activities related to sand mining prevalent along the coast are the reasons that keep the turtles away. The Social Forestry Wing of the Kerala Forests and Wildlife Department is developing a site-specific action plan for its turtle conservation initiative launched under the title 'Green Partnership Programme'. Kerala also pioneers in community-based turtle conservation efforts in the country.

**Karnataka:** The state forest department initiated the sea turtle conservation efforts following the sea turtle workshop organized by ICAR-CMFRI in the year 1984. Olive ridley, green and hawksbill turtles are reported to occur in the Karnataka but, only the first species has been reported to nest sporadically along Karanataka coast.

As per the Karnataka Marine Fishing Regulation Act, 1986; mechanized boats (up to 50 feet length) are allowed to operate beyond 6 km and deep-sea vessels (of 50 feet length and above) are required to operate beyond 20 km. Assessment of trawl bycatch by the Mangalore Research Centre of ICAR-CMFRI recorded 116 species of finfishes, 31 species of gastropods, 4 species of bivalves, 7 species of cephalopods, 13 species of shrimps, 3 species of stomatopods, 21 species of crabs, 3 species of lobsters and juveniles of unidentified sharks and rays were recorded but none of the sea turtle species.

**Goa:** According to the Goa, Daman and Diu Marine Fishing Regulation Act, 1980 (amended in 1989), mechanized fishing vessels are allowed beyond 5 km. The Forest

Department of Goa along with involvement of locals started the Turtle Conservation Programme in 1996. Only Olive Ridelys nest along Goa coast between November and April with identified nestings in Mandrem, Morjim, Agonda and Galgibaga beaches of Goa. Ecotourism is highly promoted where Forest department, NGOs and local people create special Eco-huts for tourists to watch this natural phenomenon from a distance. Recently, the Goa Coastal Zone Management Authority's (GCZMA) ordered demolition of 171 structures built in the No-Development Zones at beaches which have turtle nesting sites. So far, incidental catches of sea turtles have not been reported since the turtle population is very small and only sporadic stranding of sea turtles has been reported.

**Maharashtra:** As per the Maharashtra Marine Fishing Regulation Act 1981, operation of trawl net by mechanized fishing vessels is prohibited from the seashore to 5 fathoms and 10 fathoms depth zone in specified areas. Fishing by mechanized fishing vessels of any type with more than 6 cylinder engines is prohibited within the territorial waters of Maharashtra up to 22 km and operation of trawl gear by mechanized fishing vessels is prohibited between 6 pm and 6 am.

The nesting season of Olive Ridley turtles is from October to March with reports of sporadic nesting along the entire coast. There are some reports of nesting of green turtle also. Main nestings of Olive Ridelys in Maharashtra occur in Sindhudurg and Ratnagiri districts. In Velas, a tiny village on the northernmost boundary of Ratnagiri district the locals started turtle conservation since 2002. The annual Turtle Festival attracts around 3000 tourists a year giving new income opportunities for the villagers. Monitoring of turtle nesting in 39 locations across 4 districts of Maharashtra is being done since 2002. The Maharashtra forest department and Wildlife Conservation and Animal Welfare Association (WCAWA) have jointly announced reward ₹5000 for giving information about incidents of egg laying and incentives for release of threatened and endangered species of turtles. Sea turtles included in the Wildlife Protection Act, 1972 and killing or destroying their eggs is a criminal offence that can be fined upto ₹24,000 and 7 years of imprisonment. The 'Turtle treatment and transit centre' at Dahanu beach on an average, rescues, treats and rehabilitates over 60 turtles including Olive Ridley, Green Sea Turtles, Hawksbills and Loggerheads every year besides undertaking awareness programs for turtle conservation along the beach.

**Gujarat:** Nesting grounds of Green and Olive Ridley turtles were recorded from Jamnagar, Junagadh, Amreli, Bhavnagar and Valsad districts. In Kachh, only nests of Olive Ridley were recorded. The nesting season of the Olive Ridley begins in June and ends in early November, while green turtles nest between July and January. Gujarat state forest department is implementing sea turtle hatchery management programme for the past 20 years. It has set up five hatcheries in Madhavpur (Porbandar) and Okha Madhi (Jamnagar) where eggs are collected and brought to an enclosure to ensure their hatching.

**Sea turtle menace in Lakshadweep:** In Lakshadweep Islands, especially in Agatti, Kadmat and Kalpeni Islands, Green sea turtles (*Chelonia mydas*) population is in higher densities than anywhere else in India. This high congregation of turtles has resulted in over-grazing of seagrass and loss of seagrass habitats in the Islands. The severe consequences of seagrass overgrazing include loss of seagrass meadows, biodiversity loss, reduction in productivity, erosion of intertidal area, siltation, creation of turbid plume of silt particles, death of corals due to sedimentation and poor molluscan diversity. Fishing is the primary occupation here, dominated by pole-and-line fishing for the pelagic skipjack tuna using bait fish which are mainly distributed in the seagrass beds of the lagoon. Because of the disappearance of seagrass which are the natural habitats of baitfish, there is scarcity of bait fishes and fishermen are not happy as it is adversely affecting their livelihoods. Explosion of sea turtle population is changing seagrass dominated lagoon ecosystem into algal rich habitats. The increase of green turtle population in Lakshadweep is the result of protective measures taken by the Indian government. So, there is an urgent need to conserve the seagrass ecosystem and their associated fishes and fisheries as well as management of sea turtle population within the limits necessary to protect the livelihood of people in Lakshadweep.

## Shrimp fisheries in India and US Shrimp Import Ban - 2018

Sea turtles are highly migratory across the oceans and particularly vulnerable to incidental capture, leading to their global population declining rapidly. In 1981, the US National Marine Fisheries Service (NMFS) developed a unique separator trawl design called the Turtle Excluder Device (TED), which claimed to reduce

the turtle mortality during shrimp trawling by up to 97 per cent. In 1987, it was mandatory for all shrimp trawlers in the United States of America (USA) to use TEDs. The US fishermen demanded their government to make TED mandatory for foreign shrimpers as well since they did not incur extra costs to install and use TEDs and were getting larger catch without the mandatory TEDs. It led to the enactment of the Section 609 of Endangered Species Act (Public Law 101-162) by the US Congress in 1989, requiring the US government to certify that all shrimp imported to the country was caught with methods that protected marine turtles from incidental drowning in shrimp trawling nets. In May 1996, the USA made it mandatory for countries exporting shrimp to the US to set in place a marine turtle conservation program comparable to that of the US and imposed a ban on importing shrimp from countries not certified as using TEDs. However, this ban on imports did not apply to shrimps produced through aquaculture.

Commercially important shrimps from India are largely constituted by two groups namely penaeids mainly belonging to the family Penaeidae and non-penaeid shrimps belonging to Palaemonidae, Hippolytidae and Sergestidae. The US has banned import of wild caught shrimp from India on May 2018, after the US Department of State found the fishing practices followed in India were non-compliant with US regulations to protect sea turtles. Wild-caught shrimp constitutes around 11 per cent of the ₹1500-crore shrimp export to the US from India.

In the main land of India, fishing take place by numerous fishing crafts and landings of marine fish at 1265 centres situated along 6100 km long coast line. India is taking utmost care in protecting the sea turtles but it is a herculean task. Generally, sea turtles live in coastal waters up to 5 nautical miles. Almost all the coastal states of India implemented the trawl fishing ban within the 5 nautical miles under the 'Fishing Regulation Act'. Apart from these, yearly fishing ban for the period of 60 days also followed by coastal states. It is reported that each sea turtle feeds 1.5 kg of seafood per day. Olive Ridley turtles mainly feed on fishes, shrimps, crabs, jellyfish and molluscs. Every year, more than 6 lakhs Olive Ridelies are nesting on the eastern coast of India, which is half of the world's population. It is estimated that more than 600 tons of seafood per day are consumed by the Olive Ridley turtles in India. The coastal resources of India

is very much utilized for the conservation of world's sea turtle population and therefore, the US import ban on shrimps from India is untenable. Appropriate actions that will prove the regulatory mechanisms to conserve sea turtles in India are comparable to those in the USA will have to be done. Based on this, following recommendations are made

## Recommendations

- The TED developed/ modified by ICAR-CIFT is not acceptable by the US expert team. Therefore, suitably modified TEDs can be explored.
- TED should be fit in all shrimp trawlers operating on the east coast of India during the turtle nesting season. Yearly renewal of trawler license should be based on fitting of TEDs.
- The trawl fishers in Thiruvananthapuram and Kollam district of Kerala coast should be mandated to fit TEDs. Due to the very low intensity of turtle nesting further north of west coast of India does not warrant the use of TEDs.
- Continuous monitoring of sea turtle incidental catches in fishing gears is mandatory as per US Sec. 609. Hence, regular by-catch monitoring programme should be initiated all along the coast in India.
- Action must be taken to supply adequate number of TEDs to fishers who should also be trained to use them.
- Awareness programme on sea turtle conservation and demonstration of TEDs among fishers is important. The misconception that the trawler fitted with TED considerably reduces their catches should be changed by proper demonstration.
- Translocation of sea turtles eggs and hatchling from thickly/healthy populated areas such as Lakshadweep to areas where the sea turtles have disappeared due to various reasons is an option.
- Incentive schemes should be announced to protect the endangered sea turtle species such as Leatherhead and Loggerhead turtles.