

Research gaps in the conservation of Olive Ridley turtles in Odisha

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The Olive Ridley turtles, zoologically named *Lepidochelys olivacea*, are a group of marine reptiles, having a circumtropical distribution in more than 60 countries (Abreu-Grobois and Plotkin 2008). This species occupies unique ecological niches and exhibit intra-specific variations in population sizes, reproduction and morphology (Wallace et al., 2010). It is the only species that exhibit two types of reproductive behaviour: females can either emerge in mass nesting events called arribadas, or they will emerge solitarily or in a small group without synchrony (Kalb, 1999). Despite being the most abundant of all the sea turtles found globally, their numbers have been declining in the past few years, due to which they are currently listed as Vulnerable in the IUCN Red List (Abreu-Grobois and Plotkin, 2008).

Olive Ridley turtles got their name owing to their olive coloured, heart-shaped carapace. These turtles grow to about 2 feet in length and weigh up to 50 kg. Males and females grow to the same size; however, females have a slightly more rounded carapace than the male. They are carnivores and feed mainly on jellyfish, shrimp, snails, crabs, molluscs and a variety of fish and their eggs. These turtles spend their entire lives in the ocean and migrate thousands of kilometres between feeding and mating grounds in a year.

Interestingly, females return to the very same beach where they first hatched to lay their eggs. During this phenomenal nesting, around 600,000 and more female turtles come out of the ocean, over a period of five to seven days, to lay eggs. They lay their eggs in conical nests about one and a half feet deep, which they laboriously dig with their hind flippers. After about 45-65 days, the eggs begin to hatch, and these beaches are then occupied with crawling Olive Ridley turtle babies, which then head back towards the ocean.

The coastal belt of Orissa in India is the largest mass nesting site for the Olive Ridley turtles, followed by the coasts of Mexico and Costa Rica. 90% of the population of sea turtles along the Indian coast are those of Olive Ridley turtles (*Lepidochelys olivacea*) found in Odisha (https://www.wildlife.odisha.gov.in/webportal/SeaTurtle_Conservation.aspx). Almost 50% of the global population of Olive Ridley turtles congregates along the beaches in Odisha every year from October to May. Olive Ridley turtles' synchronized mass nesting (called Arribada) at several locations along the coast of Odisha is part of a distinct genetic population that nest along the east coast of India (Shanker et al., 2004a). These turtles have a major influence on

the structure and function of marine biodiversity and play an important role in shaping the behaviour and life-history traits of prey species and predators that is critical for the sustainability of fisheries in the region.

There are several locations along the Odisha coast where Olive Ridley turtles congregate for mass nesting. Out of all the nesting beaches, the legal conservation has been accorded to Gahirmatha rookery, which is part of Gahirmatha Marine Sanctuary (GMS), whereas the rest of the nesting beaches are not protected as they are out of the sanctuary area (such as those near the mouth of rivers Devi, Rushikulya, Mahanadi, Subarnarekha, Budhabalanga, Keluni and Bahuda) (Figure 1). There have been demands, in particular, to protect the beaches at the mouth of rivers Devi and Rushikulya by according them the status of Wildlife Sanctuaries (Sridhar et al., 2005). However, the state government has so far adopted **band-aid approach only by banning fishing activities for seven months (from November to May) by motorized vessels, trawlers and those using mechanized fishing techniques within 20 kilometres from the river mouths of Dhamra, Devi and Rushikulya** (Notification by Odisha State Government Dated 31 October 2014). This notification is reissued every year at the end of its term. The habitats near the mouth of rivers Devi and Rushikulya are not protected areas and are managed/controlled by various stakeholders, including Forest and Environment Dept., Tourism Dept., port authorities, local administrative authorities and fishermen.

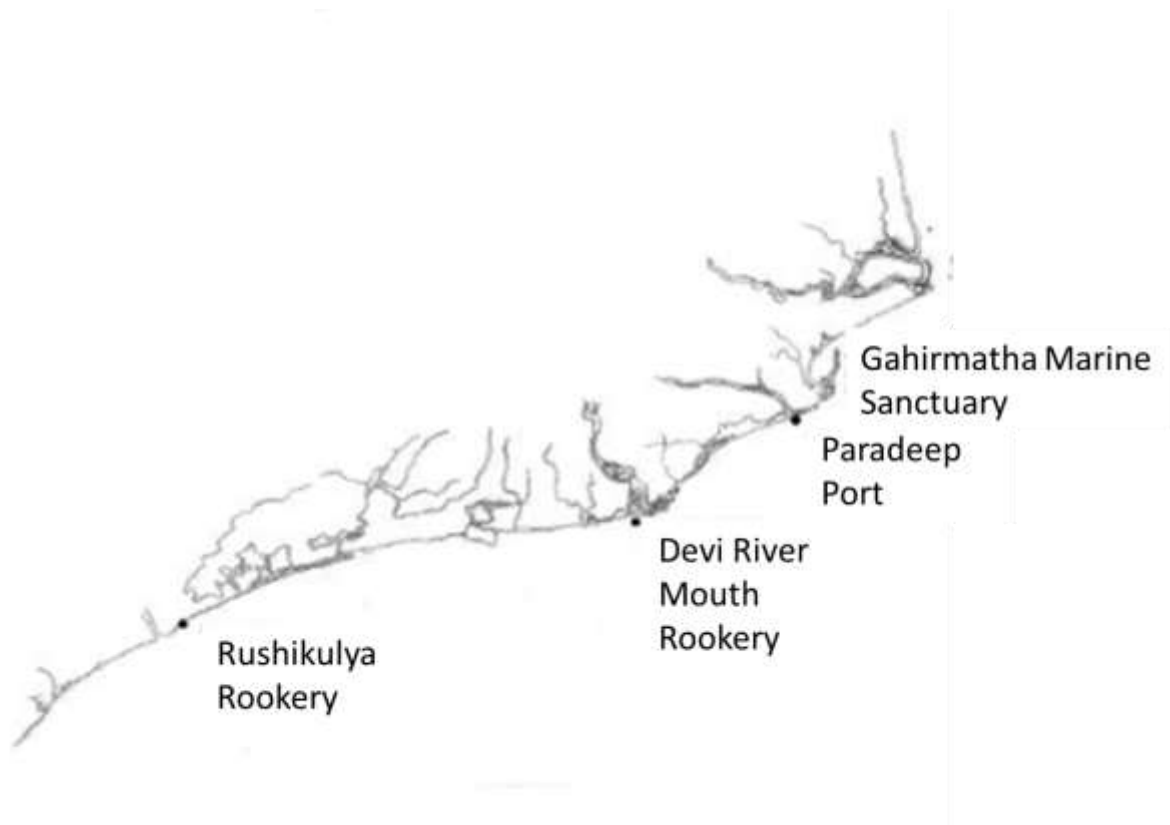


Figure 1: Map showing the location of major turtle rookeries along Odisha Coast (Modified after Sridhar 2004)

However, the population of the Olive Ridley turtles is declining because of a slow intrinsic growth rate coupled with anthropogenic pressures. Degradation, transformation and destruction of natural conditions at nesting beaches from coastal developments (including industrialization and urbanization) continue to threaten the long-term survival of Olive Ridley rookeries (Tripathy and Rajasekhar, 2009). Olive Ridelys are victims of several threats along the coast. Apart from offshore fishing-related mortality, Casuarina plantation, beach erosion, artificial illumination and predation of eggs and hatchlings affects the animal directly through the loss of nesting habitat or indirectly through changes in the thermal profiles of the beach. The failure of arribadas in 1997 and 1998 accompanied by the sharp decrease in size of adults suggest a potential or imminent decline in the population, consistent with fishery-related mortality of at least 1,00,000 turtles since 1994, and 10,000-15,000 turtles per year since 1999 (Pandav, 2000; Shanker et al., 2004b). Even in this year since January, nearly 800 carcasses have already been observed in Odisha. Much of this mortality is attributed to drowning in trawl nets (Pandav and Choudhury, 1999) or due to entanglement in gill nets (Wright and Mohanty, 2001).

Therefore, it is important to conserve and protect these endangered species and their habitats for a sustainable healthy marine ecosystem. However, so far, there does not exist any effective plan for conserving and protecting this keystone species along the Odisha beaches though some sporadic studies have taken place. In addition, there is a need to adopt a participatory approach (involving various stakeholders such as State Forest and Environment Department, State Tourism Department, Port authorities, social scientist, environmentalists, industries, local communities, fishermen etc.) to the problem of conservation of turtles and their habitats rather than a prohibitory approach.

Olive Ridleys face serious threats across their migratory route also. These threats are due to human activities such as turtle unfriendly fishing practices, development and exploitation of nesting beaches for ports and tourist centres. Though international trade in these turtles and their products is banned under CITE, they are still extensively poached for their meat, shell and leather. Their eggs, though illegal to harvest, have a significantly large market around the coastal regions. However, the most severe threat they face is the accidental killing of adult turtles through entanglement in trawl nets and gill nets due to uncontrolled fishing during their mating season around nesting beaches. To reduce the accidental killing in India, the Orissa government has made it mandatory for trawls to use Turtle Excluder Devices (TEDs), a net specially designed with an exit cover that allows the turtles to escape while retaining the catch. However, this has been strongly opposed by the fishing communities as they believe TEDs result in the loss of a considerable amount of the catch along with the turtle. WWF-India, along with its partners, disproved this theory by conducting a study to measure the loss of catch through TEDs, revealing the loss to be a very small percentage of the total catch. This result, along with regular meetings with the fishing communities, is slowly helping to change their mindset and encourage the use of TEDs, thereby aiding the conservation of Olive ridley turtles. Chandrana et al. (2017) reported that “In areas where marine turtles and local communities coexist, conflicts have emerged due to the shared spaces on land and at sea. With mounting pressure to conserve turtles, decisions to reduce this conflict are made without an understanding of the scenario on the ground. Many conservation measures fail when opinions and perspectives at the grassroots are not taken into consideration. At the Rushikulya mass nesting rookery, local fishers face livelihood losses due to conservation measures enforced during the turtle breeding season. The alternative livelihood options that have emerged as potential solutions in the past have failed to deliver. Making decisions and providing recommendations

for policy for the use of this space without the necessary background only exacerbates the conflict and renders any action unsustainable.”

Olive Ridley turtles are flagship icons for the conservation of coastal and marine ecosystems, as they use a wide variety of habitats. It is necessary to sustain long-term monitoring programmes to assess population trends and the impact of perceived threats to these populations. Local monitoring and research programmes directly feed into training for local agencies, and the information thus collected can inform long-term and large-scale studies and conservation planning and management.

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