

## AWAITING ARRIBADDA



### **Protection of Olive Ridley Turtles (*Lepidochelys olivacea*) and their Habitat at Rushikulya Rookery in Orissa**

Basudev Tripathy



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Protection of Olive Ridley Turtles  
(*Lepidochelys olivacea*) and their Habitat at  
Rushikulya Rookery in Orissa



Basudev Tripathy

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## **PREFACE**

There is perhaps no mass-wildlife spectacle in India that is as stunning as the Olive Ridley turtles nesting on the beaches of Orissa. Every year, for a few days as winter wanes, these large and ancient reptilians haul themselves laboriously out of the water and lay hundreds of pearly white eggs into the sands of the coast. While this phenomenon happens across the coast of eastern India and even on the Andaman and Nicobar islands, a few places such as Gahirmatha, Devi mouth and Rushikulya are the places where the arribada or mass arrivals happen. Rushikulya is the focus of this Rapid action project that the Wildlife Trust of India did with the Rushikulya Sea Turtle Protection Committee at Ganjam. A team of committed youngsters showed what can be done to protect the beach from disturbances during nesting, clear it of litter, spread awareness and protect the eggs and hatchlings at times of maximum stress. What is important in this sort of an activity is the awareness component, as beach cleaning and turtle protection drives are nature conservation activities that any enthusiastic person can participate in, like bird watches, thereby helping build a community of conservationists in the long run.

All the species of the world's marine turtles are threatened and this is why even small actions such as this done in one area for one year is important as a cog-in-the-wheel in the efforts to conserve marine chelonians. It also shows what local youth inspired by conservation zeal, backed by science and with the support of the local community (in this case fisher folk) can achieve with very modest funding. What is critical is that such sets of people must come up for each beach each year and do their bit- and marine turtles can leave their eggs and potential hatchlings in the sand and return to the sea, knowing that they are in good hands.

Vivek Menon  
Executive Director, WTI

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Dr. Naim Akhtar of WTI not only introduced me to the RAP opportunity but gave comments and suggestions on the proposal.

My heartfelt thanks to the members of Rushikulya Sea Turtle Protection Committee, Purunabandha, Ganjam for their help and cooperation in all the RAP activities at Rushikulya rookery. I am grateful to Rabi, Shankara, Kali, Abhi, Nauka, Mitu and Dambaru for their help and hard work towards successful completion of the project.

And last but not the least, I thank the villagers and fisherfolk of Purunabandha and adjoining villages of Rushikulya sea turtle rookery for their generosity and hospitality during the project work.

## EXECUTIVE SUMMARY

The present piece of conservation work was undertaken along the Rushikulya sea turtle rookery of Orissa from January to June 2004. The project aimed at protection of Olive Ridley sea turtles, their nests, eggs as well as nesting beach during the breeding season. The entire six kilometer mass nesting beach of Rushikulya was made free from garbage. Round-the-clock protection was given to the sporadic and congregated nests on the beach. *Ex-situ* conservation of eggs was undertaken for safeguarding the eggs from inundation and non-human predation. Sea turtle hatchlings were protected from disorientation and stranded hatchlings on the beach were released back to the sea safely. Community participation for sea turtle conservation was also attempted at the adjoining villages of Rushikulya sea turtle rookery along the Orissa coast. Based on the protection work, the following recommendations were made:

- 1. Beach cleaning:** An annual cleaning programme of the nesting beach should be initiated at the beginning of the sea turtle breeding season
- 2. Monitoring:** Proper monitoring of the sea turtle nesting population must be done. New Casuarina plantations should be discouraged along the nesting beach
- 3. Community involvement:** Nest protection activities involving the local community should be carried out throughout the breeding season. Relocation of nests should be done by a community managed sea turtle hatchery. Community-based sea turtle conservation should be promoted at this rookery
- 4. Awareness building:** Sea turtle awareness should be created in all the coastal villages.



## **1. INTRODUCTION**

Sea turtles are marine reptiles that first evolved about 100 million years ago on the earth and have over the years become highly successful animals in the marine ecosystem. All species of sea turtles share similar life-cycle patterns with very minor differences. Even though sea turtles cover all the world's tropical and subtropical seas with spectacular adaptations for a life in water, they are highly dependent on the well-being of beaches. Though many reptiles have returned to partial or complete lives in the water (like freshwater turtles, sea turtles and crocodiles), all of them are still tied to land for one phase of their life, namely reproduction. Hence, sea turtles need sandy beaches to lay eggs. Furthermore, sea turtles are highly philopatric, meaning that they return to the same beaches where they were born, to lay eggs as adults.

Over the last few decades, sea turtles have become threatened by human overexploitation and marine pollution. Human disturbances, both direct and indirect are the primary reason for the current decline in populations of sea turtles worldwide. Sea turtles and humans come into conflict in three areas: direct harvest of adult females and their eggs; loss of habitat, including both nesting and foraging grounds; and incidental capture of turtles at sea during fishing. The Convention on International Trade in Endangered Species of Flora and Fauna (CITES) lists all the species of turtles on Appendix I (prohibited from international trade) and the World Conservation Union (IUCN) currently lists this species as Endangered.

## 1.1 The Olive Ridley Sea Turtle

Of the seven species of the world's sea turtles, four species are known from Indian seas and the Olive Ridley (*Lepidochelys olivacea*) turtle is the most numerous along the mainland coast. Olive Ridley turtles are a widely distributed species, and like the rarer Kemp's Ridley (*Lepidochelys kempii*), exhibit the phenomenon of synchronous mass nesting, known as arribadas (a Spanish term referred to as mass arrival). While Kemp's Ridleys consist of a single nesting population, Olive Ridleys are considered the most abundant of the sea turtles. Nesting aggregates of over 100,000 females have been reported from Pacific Mexico, Pacific Costa Rica and Orissa on the east coast of India.

Olive Ridleys also nest at several sites in the western Indian Ocean, Indian subcontinent and Southeast Asia. However, the single most important breeding area for Olive Ridleys in the Indian Ocean is Orissa, which has three known arribada beaches at Gahirmatha and the Devi and Rushikulya river mouths (Pandav *et al.*, 1998). Gahirmatha was first reported by Bustard in 1974, Devi rookery was discovered in 1983 (Dash and Kar, 1990) and the Rushikulya rookery was discovered a decade ago (Pandav *et al.*, 1994).

The major problem for Olive Ridleys in Orissa is not because of poaching of eggs or killing of turtles for local consumption as trade practice has almost stopped in many areas of the countries but the current threat is mostly from incidental capture related mortality in marine fisheries. However, the problems are different in different places. The Devi and Rushikulya river mouth rookeries are suffering from anthropogenic activities.

## **1.2 The Rushikulya Sea Turtle Rookery**

Nesting of Olive Ridley sea turtles near the mouth of River Rushikulya is known since 1990 and mass nesting was discovered in 1994 (Pandav *et al.*, 1994). Anthropogenic stress, such as lighting close to the nesting beach, Casuarina plantations, developmental activities such as industries, human settlements and military installation along the Rushikulya rookery are known to impact the nesting turtles as well as the hatchlings.

The major problem in Rushikulya is the coastal illumination near the beach, which comes from the Ganjam Township and Jayshree Chemicals. The lighting from the industries and townships are posing a threat to nesting turtles as well as the baby hatchlings. Beach lighting is harmful to turtles because this disorients adults and hatchlings and they unable to find their way back to the sea after emerging from the nest and die of desiccation or predation by feral dogs and birds. Similarly extensive plantation of Casuarina (Jhaun) near the beach also makes the beach unsuitable and less area is available for turtles to nest. Hence, the loss of nesting habitats can have disastrous consequences for turtle populations.

## **1.3 About the Rapid Action Project (RAP) at Rushikulya**

The importance of this rookery has increased in the recent years following the decline of other rookeries due to habitat loss. The sand dunes near the river mouth of Rushikulya provide optimal nesting sites for the endangered olive ridley. But natural and man-induced factors poses a great threat to the nesting habitat, the nesting females, their eggs and hatchlings, thus endangering the recruitment to the population. The floods in Orissa during 2003 accumulated lot of garbage on the beach,

thus making the beach temporarily unsuitable for turtle nesting.(Figure 1)  
The protection of the nesting beach as well as sea turtle eggs and hatchlings are priority for saving the Olive Ridley population along the Orissa coast. Keeping this in mind, the Wildlife Trust of India's Rapid Action Project (RAP) was initiated with an effort towards protection of nests, eggs, and hatchlings and to the nesting habitat as a whole.



Figure 1: The 2003 Flood had deposited all kinds of waste on the beach at Rushikulya Rookery, Orissa

## **2. OBJECTIVES**

The sea turtle fieldwork was carried out between January to May 2004. The Rapid Action Project (RAP) had the following broad objectives:

- Cleaning of debris on the six-kilometer long mass nesting beach of Rushikulya sea turtle rookery.
- Round-the-clock protection of sea turtle nests from feral dogs and other predators.
- Relocation of nests that were in danger of ruin due to erosion.
- Protection of hatchlings on the beach from disorientation.
- Releasing of disoriented hatchlings to the sea.
- Community involvement in the conservation programme.

## **3. PROJECT AREA**

One of the important maritime states in India, Orissa's coastline of 480 km, stretches from the east of the Subarnarekha river mouth near Udayapur village of Balasore district bordering West Bengal, to the marshes of Ichhapuram in Andhra Pradesh (AP) bordering Ganjam district.

The undivided district coastline of Ganjam (60 km) extends south of Prayagi village to Patasonapur village bordering AP. It is intercepted by rivers Rushikulya and Bahuda. Over two km long sandpits are present on both sides of the Rushikulya and Bahuda River mouths. The coast near Gopalpur is being developed as a minor port. Near Chatrapur town, the Indian Rare Earths Ltd. mines the beach for sand. Recently, the Reliance Petroleum has identified the offshore waters of Rushikulya rookery for a major oil exploration.

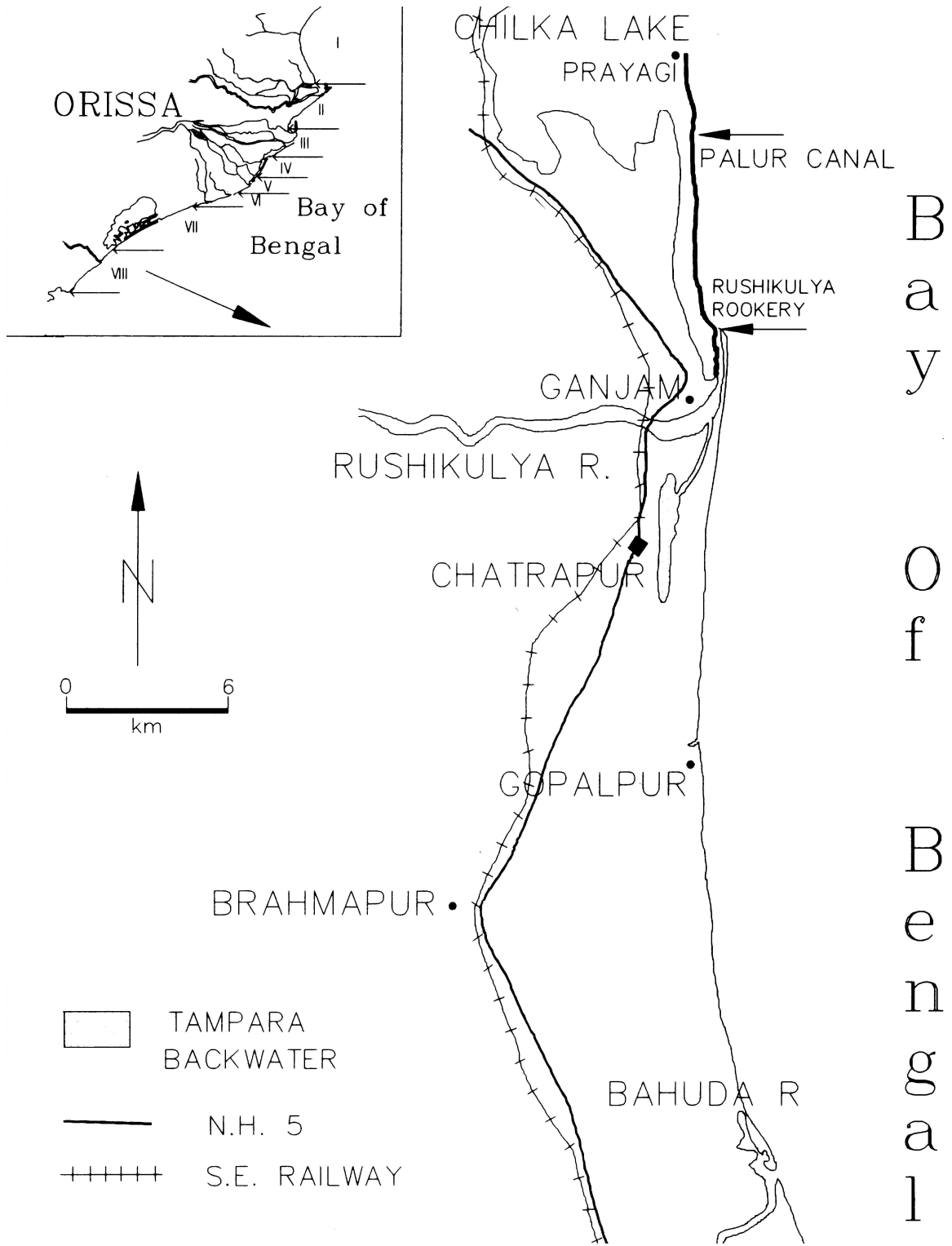


Figure 2: Map showing location of Rushikulya sea turtle rookery, Orissa coast

The Rushikulya Sea Turtle rookery is located on the northern bank of Rushikulya river-mouth and is only one km east of the Chennai-Calcutta National Highway No.5 and the East Coast Railway near Ganjam town, 12 km north of Gopalpur seaport and 300 km south of the Gahirmatha mass nesting beach (Figure 2). The Rushikulya rookery is spread over six km, from the village Purunabandha (one km north of the Rushikulya River mouth) to Kantiagada village. The Palur canal, which joins the Chilka Lake with Rushikulya, runs parallel to the nesting beach for eight km. At present, this rookery and its nearshore coastal waters do not come under any Protected Area jurisdiction.

Human settlements near the mass-nesting beach include the fishing villages of Purunabandha and Palibandha, and the major fish landing centres are Gokhurkuda, Kantiagarha and Nuagaon.

## **4. METHODS**

The Rapid Action Project formally began operations from 6th January 2004 for a period of six months. The Orissa Forest Department was informed about the RAP at the Rushikulya rookery of Orissa, under which the following activities were undertaken:

### **4.1 Beach Cleaning**

As per the schedule, the beach cleaning programme was undertaken daily from 10th January 2004 and continued upto 16th January 2004 . The Rushikulya Sea Turtle Protection Committee (RSTPC) members were involved in the cleaning programme (Figures 3 and 4). The RSTPC members along with the Investigator carried out the work every afternoon from 14:00 to 18:00 hrs. Garbage on the beach, such as plastic articles, polythene, glass pieces, torn clothes and other such non-biodegradable

and biodegradable items were collected in a phased manner from Rushikulya river mouth upto a distance of four kilometers north of river, i.e. the coastal village Kantiagarha. Biodegradable and non-biodegradable wastes were segregated and the latter were dumped at a safer distance from the beach. The biodegradable wastes were burned on the beach.

After the cleaning programme was undertaken, the entire four-kilometer beach become almost free from plastic, polythene, glass or any kind of debris. Sporadic nesting of olive ridley sea turtle started on this stretch from the last week of January 2004 and turtles were found nesting without any disturbances since then.

#### **4.2 Sea Turtle Arribada**



Figure 3: The Rapid Action Project (RAP) Team at Rushikulya Rookery



Figure 4: Beach cleaning programme was undertaken by the RAP at the Rushikulya Rookery



## **Monitoring**

The investigator, RAP assistants and RSTPC members closely monitored the entire four kilometers of beach to record sporadic nesting and to rescue these nests from predation. Yet, many of the nests in January 2004 could not be saved, due to dispersed nesting by turtles.

Mass nesting used to take place immediately north of the river mouth at Rushikulya and upto two km on the beach. However, a shift in the arribada site of Olive Ridleys along the Rushikulya rookery was noticed during the current year and mass nesting took place after Gokhurkuda and upto Kantiagarh beach, which are two kilometers away from the actual mass-nesting site. This could be due to a change in beach profile at the old site and a clean and safe beach for nesting at the present arribada site.

The season's first mass nesting was witnessed on the debris-cleared two-kilometer beach near Kantiagarha village on 20th February 2004, where more than 800 turtles nested in a single night. However, there was no mass nesting during subsequent nights and it was once again sporadic till the first week of March. The RAP team made all attempts to save as many nests as possible from erosion and from the danger of predation (Figure 5). A total of 84 nests were relocated immediately after the nesting. Immediately after the nesting was over, eggs from nests which were in danger of predation and erosion were collected and handled with due precautions. They were relocated to safer places on the less used nesting areas of the new mass-nesting beach. The RAP local assistants guarded these nests round-the-clock until hatchlings returned to the sea (Figure 6).

10th March 2004, once again, saw the mass nesting of Olive Ridley sea turtles on the same beach near Kantiagarha and the arribada continued for four days. The first arribada night received ~ 10,000, the second night peaked with ~80,000, touched a figure of ~ 20,000 on the third night and then ~ 8,000 on the fourth night. The nesting become sporadic after 14th March 2004 and in total, approximately 1,20,000 nested at the Rushikulya rookery over a period of four to five nights. During this period, a total of 150 nests were relocated on the mass-nesting beach.

#### **4.3 *In-situ* protection of nests**

As a precautionary measure to save the sporadic nests from non-human predation, local assistants were deployed on the beach from mid February. All necessary arrangements had been made to protect the nests from feral and other predators from mid February. The Investigator along with the RSTPC members and RAP local assistants also visited the



Figure 5: Those nests in danger of erosion and predation were transplanted immediately after nesting

four km stretch beach every night to rescue sporadic nesting eggs from non-human predators. The RAP local assistants guarded the nests during daytime and the investigator and the RSTPC members during night. However, protection activities could not be 100 % successful due to inadequate manpower (the Orissa Forest Department personnel allowed only a limited number of people to the beach for patrolling). There was no incidence of poaching of eggs for local consumption recorded from the mass-nesting beach during the entire project work duration.

#### **4.4 *Ex-situ* protection of nests**

As a protection measure, the relocated nests were guarded by the RAP local assistants as well as by the RSTPC members for the entire incubation duration. Out of the total 234 relocated nests, from 189 nests, hatchlings emerged successfully (more than 90%) whereas 45 nests had



Figure 6: A RAP assistant collecting nest contents from the eroded beach

50 % emergence success. The low emergence success from 45 nests may be due to delay in relocations, as during mass nesting, many nests could not be relocated immediately.

#### **4.5 Releasing of disoriented hatchlings**

The first batch of hatchlings emerged during the first week of April 2004. Hatchlings from very few nests emerged during this time, as many nests of the first arribada suffered from beach inundation. However, the nests of the second arribada had greater hatchling emergence. The mass hatching of sea turtles occurred from 26th April upto 2nd May 2004, during which more than 80% of the hatchlings emerged successfully. As a precautionary measure, nets were embedded on the beach at a safe distance so that disoriented hatchlings could be checked from landward orientation (artificial illumination is a hindrance for hatchlings as they move towards the light instead of going back to the sea on their own). A total of 500 m long stretch on the heavy nesting zone on the beach was embedded with nylon mosquito net of 30 cm width.(Figures 7 and 8)

Every morning, disoriented hatchlings were collected from the nets as well as from the beach in plastic tubs and buckets and were released back to the sea safely. The hatchling collection activities were carried out between 5:00 AM and 8:00 AM every day for the entire mass hatching period. In total, at least 500,000 hatchlings could be saved from dying due to desiccation or predation by avian predators.

#### **4.6 Community Participation in Conservation**

The project at Rushikulya sea turtle rookery also made an attempt to bring the local community into the forefront of sea turtle conservation. As

a confidence building measure, the investigator had a permanent camp for the entire project duration at the Purunabandha village (Figure 9). The other coastal villages viz. Gokhurkuda and Kantiagarh were also visited regularly and awareness on sea turtles and their conservation was created among the fishermen through audio-visuals.

## **5. RECOMMENDATIONS**

The Rapid Action Project was an attempt to protect sea turtle nests, eggs and hatchlings on the Rushikulya beach as well as to safe guard the beach and its surrounding area from pollution. The RAP was successful in its attempt in many aspects. For the first time in this place, beach-cleaning activities were undertaken at the arribada site. Protection of nests and relocation of eggs were done and hatchlings were released back to the sea safely. However, similar actions must continue in the future for survival of the sea turtle population, at least along the Orissa coast.



Figures 7 and 8: Plastic barrier nets were embedded to check the disorientation of hatchlings towards the source of light

Based on the present work, the recommendations for future sea turtle conservation and protection along the Rushikulya rookery are as follows;

1. **Beach cleaning:** An annual nesting beach cleaning programme should be initiated at Rushikulya rookery at the beginning of the sea turtle breeding season i.e. October-November.
2. **Monitoring:** There needs to be a proper monitoring of the sea turtle nesting population at Rushikulya rookery. The mass nesting stretch should be barricaded to keep dogs and jackals out of this area. New Casuarina plantations should be discouraged along the six kilometer long nesting beach (as it provides shelter to predators)
3. **Community involvement:** Nest protection activities involving local community should be carried out throughout the breeding season. Relocation of nests, which are in danger due to erosion, should be done by community managed sea turtle hatchery.



Figure 9: The permanent camp at Purunabandha village

4. **Awareness building:** Sea turtle awareness should be created in all the coastal villages. Local people should be trained on various aspects of sea turtle conservation and management through training workshops at village levels.

Any conservation effort will be more effective only if people are taken into confidence and if they participate in the processes. Therefore, community based sea turtle conservation (protection of nests and releasing of hatchlings etc.) should be promoted at this rookery.

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The mass nesting of Olive Ridley turtles (*Lepidochelys olivacea*) along the coast of the eastern Indian state of Orissa is affected by anthropogenic pressures. The six-kilometer beach at Rushikulya is an important rookery that was the focus of this Rapid Action Project to protect the eggs, hatchlings and the habitat of the Olive Ridley turtles.



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