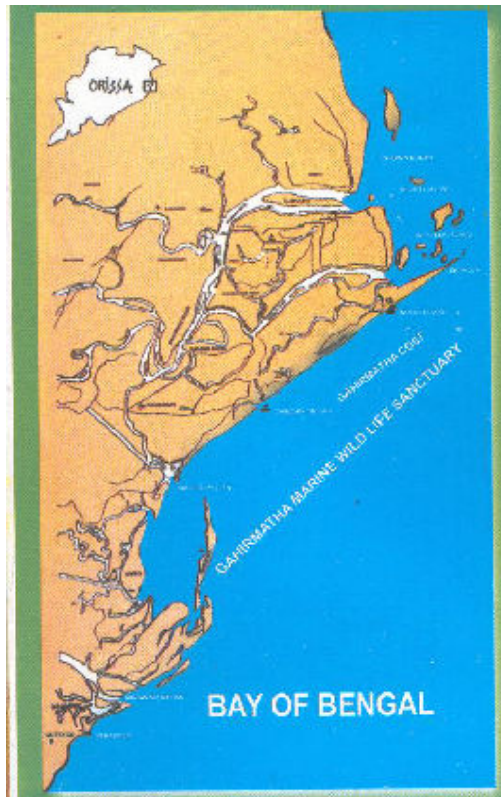
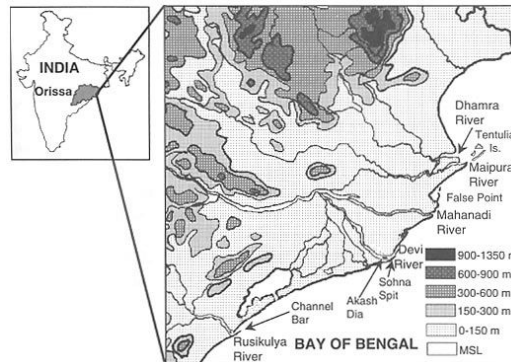


Chapter-6

Bhitarkanika: Gahirmatha Turtle Rookery

The Gahirmatha coast which separates the Bhitarkanika mangroves from the Bay of Bengal is well-known for housing the the world's largest rookery of the Olive Ridley sea turtles ((Kar 1988, Dash & Kar 1990, Kar & Satpathy 1996, Chadha & Kar 1999, Dani & Kar 1999). The next to Gahirmatha in size are Nancite and Ostional in Costa Rica and Oaxaca in Mexico. Gahirmatha is located in the river mouth of Maipura between Dharma and Paradeep port in the northern part of Orissa coast. The beach of Gahirmatha is part of Bhitarkanika National Park and is also a part of Gahirmatha Marine Wildlife Sanctuary that includes the adjacent portion of the Bay of Bengal.



Gahirmatha is the only marine wildlife sanctuary of Orissa. This was notified as such in Government of Orissa, Forest & Environment Department Notification No. 18805/ F&E dated 27th September 1997 and published in the Orissa Gazette, extraordinary No. 1268 dated 17th October, 1997. It is located between 86 degree 45'57" to 87 degree 17' 36"- East

longitude and 20 degree 17' 32" to 20 degree 45'58" - North latitude. The total area of the sanctuary is 1435.0 Sq. Km. which includes 1408.0 Sq. Km. of water body and 27.0 Sq. Km. of land mass including reserve forests, mud flats and accreted sand bars. Core area of the sanctuary consists of 725.50 Sq. Km. and the buffer zone accounts for 709.50 Sq. Km. The entire sanctuary area comes within the revenue district of Kendrapara.



The mass nesting of olive ridley in Gahirmatha was first reported by H. R. Bustard, a FAO/UNDP consultant during his all India crocodile survey in 1974. Substantial nesting has been recorded at this site with over 100,000 turtles in most years and over 600,000 turtles in peak years. Due to a cyclonic storm and beach erosion, the Gahirmatha beach was considerably reduced in size when a 3 km long spit broke away from the mainland in 1989, reducing the 10 km nesting beach to a 3 km island. Since 1997, this 3 km long island has further been fragmented into two parts (Nasi-1 and Nasi-2) and has been greatly reduced in length, width and height.

The spectacular site of mass congregation of Olive Ridley sea turtles for mating and nesting enthalls both the scientists and the nature lovers throughout the world. This unique phenomenon is hardly seen anywhere in India. That rarity of mass congregation and the cruelty meted out to these innocent marine creatures, paved the way for declaration of the stretch of water body from old light house near Batighar to Maipura river mouth as Gahirmatha (Marine) Wildlife Sanctuary.

Next to Gahirmatha, the rookery near the mouth of river Devi was discovered in 1981. The third rookery of Orissa coast, which is situated near the mouth of river Rushikulya was discovered in March 1994.



Olive ridleys:

Olive Ridley sea turtle has found place in Schedule - I of Indian Wildlife (Protection) Act, 1972 (amended 1991). All the species of sea turtles in the coastal water of Orissa are listed as "endangered" as per IUCN Red Data Book. The sea turtles are protected under the 'Migratory Species Convention' and CITES (Convention of International Trade on Wildlife Flora and Fauna). India is a signatory nation to all these conventions. The 'Homing' characteristics of the Ridley sea turtles make them more prone to mass casualty. The voyage to the natal nesting beaches is the dooming factor for the sea turtles. Since Gahirmatha coast serves as the natal nesting beach for millions of turtles, it has immense importance on turtle conservation.



Food habits

Olive Ridley sea turtles feed on marine snails, smaller forms of fish, fish eggs, crustaceans and jellyfish. Algal material is also used as food by the Ridleys. Ridleys generally crush and grind the food materials before intaking.

Migration



The best feeding ground of sea turtles may not be the best nesting ground for them. The sea turtles migrate thousands of kilometres to meet both the ends. It has been observed that Olive Ridley sea turtles migrate from the coastal water of Srilanka in the Indian ocean to the coastal water of Gahirmatha in the north. The 'Homing' characteristics and the uncanny ability to orient itself in open sea help the sea turtles to migrate over long distance without getting lost in the vastness of the sea.

Mating



Immediately after the arrival of ridley sea turtles in the coastal water of Gahirmatha, they indulge in matting activities. Males mount over the females and are often seen floating on the surface with the intermittent movement of flippers. Sometimes more than one male is seen mounting over one female. The courtship continues for hours unless there is any external threat. A female will continue to mate with several males throughout the breeding season. Mostly the mating pairs are seen off the coast of Ekakula.

Nesting



The mass nesting behaviour of Olive ridley sea turtles is known as "Arribada". Thousands of female carrying turtles scramble on the nesting beach at Nasi - I & II islands to release the eggs in flask shaped cavities. The turtles scoop the soft sand to a depth of 45 cm with the help of flippers and release 100 to 180 eggs. Before scampering on to the beach, the turtles survey the nesting ground from the sea and incase they smell and danger, they shun the beach and search for safer breeding ground. The urge to release the egg is so intense that they are so oblivious of the presence of any foreigner, at the time of nesting. Generally dark nights are preferred by the ridleys for nesting. It has been observed that nesting takes place once the southernly wind starts blowing. The period of emergence and retreat into the sea after nesting takes 45 to 55 minutes. Due to the shrinkage of the nesting beach, over crowding of turtles is observed during nesting. The eggs which are scooped out by successive nesters is known as "doomed" egg as it would never be able to hatch. Sporadic nesting is also not uncommon. These eggs are mostly damaged by predators. The nesting females emit hissing noise at the time of laying eggs as the intake of oxygen is maximum at that moment. After laying eggs, the female turtle fills up the pit with sand by the flippers and tries to camouflage the pit site. The motor turtle, rams the pit with the help of its body weight.

Hatching



The eggs inside the flask shaped pits, being incubated by sun and the metabolic heat, hatch after 50 to 60 days. The hatching takes place during night or in the predawn period to avoid predation by jackles, dogs and birds. The walls of the pit gradually collapse, thereby allowing the eggs on the lower strata to rise upwards. After the emergence of hatchlings, they immediately head for the open sea. The tiny replicas of turtles are in a frenzy to enter the sea water. This is the most spectacular sight. The hatchlings orient themselves by the reflection of stars on sea water or by the brighter horizon and head en masse towards the sea. The hatchlings swim deep into the sea until they reach the sea current. During this period large scale mortality of hatchlings take place. It is studied that 1 in 1000 survives. Bigger fishes, ghost crabs or seagulls either predate the hatchlings. Then the period of "lost year" begins.

Mortality

Every year large scale mortality of Olive ridley sea turtles are observed. The reasons are.

- Incidental capture in fishing nets.
- Large scale conversion of traditional crafts into mechanised boats.
- Release of toxic effluents by the chemical industries
- Predation.

Rampant fishing inside the restricted area is the cause of large scale mortality of ridleys. Fishermen flout all norms with the ultimate aim of catching maximum fish at the cost of sea

turtles. Some fishermen even kill the turtles intentionally to get rid of the turtles from their fishing nets.



In order to maximise fish catch, there has been wide spread conversion of traditional crafts into mechanised boats. This has enabled the fishermen to carry long nets into deeper water. Spreading of fishing nets in the turtle congregated areas have resulted in more casualties of turtles.

The increase in the number of stray dogs, jackals and wild boars has spelt danger for the sea turtles. The emerging turtles are attacked and killed by these predators.

The mortality of hatchlings occurs also due to artificial illumination, birds, ghost crabs, big fishes and other predators.

Threats to Survival of Sea Turtles

Ironically, today this bio-diversity hotspot is under threat, having virtually turned into turtle graveyards. The threats this fragile zone and its turtles face are multi-faceted including:-

Proposed Dhamra Port - Of the many threats to the Olive Ridley Turtle and the unique marine ecosystems off the Orissa coast, the decision to build a port at Dhamra is the most serious and latest. The proposed port shall be located just north of the boundary of the Bhitarkanika National Park and about 10 kms away from the Gahirmatha Marine Sanctuary. Studies and research have determined the presence of congregations of nesting turtles in the waters off the port site. This is really a fraction of the turtle population, which is at risk. The construction and dredging work that a project of this scale involves will cause severe disturbance to the coastal ecosystem, particularly the benthic flora and fauna so crucial to the food web of the turtles. Further, once shipping traffic becomes operational, oil spills, chemical leaks and illumination and pollution from townships and adjacent habitations would wreak havoc on the turtles and marine ecosystem. Additionally, this area has a dense cover of mangrove forests. Post the Super Cyclone and Tsunami the role the mangrove systems and coastal ecology play in acting as buffers and protecting coastal communities has been amply vindicated. It has been estimated that more than 2,500 hectares of mangrove forests, primarily in the Paradip-Dhamra belt were destroyed in the 1960s when the Paradip port was constructed. Since then this area has since emerged as the most cyclone prone zone. These concerns have also been largely neglected in the present project and it is most likely that the port at Dhamra will only aggravate this problem.

POSCO-proposed Port at Jatadhar and Steel Plant at Paradip- Following an MOU signed between Government of Orissa and South Korean company 'POSCO', the move is briskly afoot to set up a Steel Plant at Paradip and a Port at Jatadhar mouth, located in the vicinity of Bhitarkanika National Park. The Jatadhar mouth besides being a site for sporadic nesting of Olive ridleys is used as their migration route. There is little doubt if both these projects

materialise, there is the strong likelihood of an adverse impact on the existing feeding, breeding and migratory practices of Olive ridley sea turtles.

Incidental Catch/Fishing Related Mortality – Strange but true, the commercial fishing season coincides with the breeding season of Olive ridleys. This combined with an increasing number of mechanized fishing vessels in the 1980's spelt out death for thousands of turtles that were and are still killed every year as incidental catches. There are hundreds of trawlers, gill-netters and other mechanized boats operating in the coastal waters off the rookery areas. When these vessels speed through compact masses of turtles (female and male), they create a scattering effect with shock waves among the egg carrying females and mating pairs. This totally disrupts the congregation and mating of turtles and leads to breeding failure. This apart, turtles are hurt and killed by the slashing of propellers of mechanized boats. Many turtles including mating pairs get entangled in trawl and gill nets and die of asphyxiation. If this isn't enough, a large number of unauthorized vessels from West Bengal and Andhra Pradesh and countries like Burma, Thailand intrude into these waters to fish due to the lack of adequate law enforcing mechanisms. Though the use of Turtle Excluder Devices (TED) for trawlers is mandatory since 1997, this has not been enforced. The trawling industry is also unwilling to adopt this device, which was developed in USA for exclusive shrimp trawling and therefore unsuitable for mixed trawling characteristic of local marine fisheries. As an alternative to TED, an indigenous device called Trawl Guard has been recommended by Project Swarajya since 2002, but it is yet to receive official recognition. The State Government and the Forest and Fisheries Department in particular are responsible for the protection of these turtles. But little wonder, their role has remained conspicuously ineffective and inadequate.

Lights & Industrial Effluents - Artificial lights from anchoring vessels, ports, harbours, fishing jetties and other coastal development activities impact the breeding and nesting of the Olive Ridleys. Turtle hatchlings are extremely sensitive to artificial lighting. Even the faintest light is enough to disorient them enough to prevent them entering the sea once they hatch. Adults also rely on light cues for directional orientation. Stone armoring on the island also prevents turtles from nesting. Pollutants from several industrial establishments at Paradip including the Port and from ships coming to and from the port threaten the ecosystem. Local fishermen and NGOs believe this pollution, coupled with the destruction of mangroves and reclamation /degradation of coastal areas by prawn farms, ports, municipalities and industries is directly responsible for the falling fish catch in and around the three mass nesting sites.

Climate Change Impacts- The climate is tropical and characterized by 3 distinct seasons - summer (March to June), winter (November to February) and Monsoons (July to October). Rising sea levels and changing temperatures will affect the fragile ecosystem in the area, and thereby the turtles, which through the sanctuary in thousands between October and April every year. The Inter-Governmental Panel on Climate Change (IPCC) predicts global warming will wrap most of Orissa in a cycle of floods and drought. The urgency to get a thorough understanding of the threats posed by climate change is further heightened, as the most important weather phenomenon here is the prevalence of tropical cyclones.

Habitat loss and degradation- Uncontrolled development has led directly to the destruction of critically important marine turtle nesting beaches. Furthermore, vehicle traffic on beaches compacts the sand and makes it impossible for female turtles to dig nests. Sea walls and jetties change long-shore drift patterns and can cause erosion or destruction of entire beach sections. Beach restoration projects aimed at protecting seaside buildings, through dredging and sand filling continue to destroy important nearshore feeding grounds and alter nesting beaches. Additionally, important marine turtle feeding habitats such as coral reefs and

seagrass beds are continuously being damaged or entirely destroyed as a result of sedimentation, nutrient run-off from the land, insensitive tourist development, destructive fishing techniques and climate change.

Direct take- Hunting and egg collection for consumption is also a contributory factor for the declining marine turtle populations around the world including Orissa. Specifically speaking, the eggs of Olive ridleys are being illegally poached for consumption by the people in Orissa.

Disease- Many types of diseases have been observed in marine turtles. Recent reports of a rise in the occurrence of fibropapillomas, a tumorous disease that can kill marine turtles, is of great concern. It has been suggested that the increased occurrence may be the result of run-off from land or marine pollution that may weaken the turtles' immune system, rendering them more susceptible to infection by the herpes-like virus that is thought to cause the disease.

Natural predators - Marine turtles can lay more than 150 eggs per clutch, and lay several times each season, to make up for the high mortality that prevents most marine turtles from reaching maturity. The subtle balance between marine turtles and their predators can be tipped against turtle survival when new predators are introduced or if natural predators suddenly increase in number as a result of human interference.

Sources:

- *The Olive Ridley sea turtle (Lepidochelys olivacea) in Orissa: An urgent call for an intensive and integrated conservation programme* by Bivash Pandav, B. C. Choudhury and Kartik Shanker
- *Status and Conservation of Sea Turtles in Orissa, India* by S.K. Patnaik and C.S. Kar, 2000
- WWF India (http://www.panda.org/about_wwf/where_we_work/asia_pacific/where/india/index.cfm)
- *Mangrove Forests and Wildlife of Orissa (Oriya)* by Mr.N.C.Mohanty published by Project Swarajya, Cuttack, Orissa 1992
- *Atlas of Mangrove Wetlands of India, Part-3 Orissa*, M.S.Swaminathan Research Foundation, Chennai, India, July 2004
- <http://www.bhitarkanika.org>
- www.greenpeace.org/.../news/turning-turtle