

## Marine turtle conservation efforts in Udupi District, Karnataka

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### Introduction

Despite the sporadic nature of sea turtle nesting along the coast of Karnataka, a number of non-government organisations (NGOs) acknowledge the impacts that threaten olive ridley turtles (*Lepidochelys olivacea*) and have taken action. These groups are currently providing community awareness programmes and pursuing conservation strategies to mitigate the factors which are contributing to a severe decline in local populations. However, in spite of these voluntary efforts, much of the beachfront habitat along this coastline has already been rendered unsuitable for nesting due to the construction of sea walls, interference from artificial illumination, and noise pollution on nearby coastal highways.

Previous surveys of marine turtle populations in Karnataka are limited to a handful of studies that have taken place over the last 20 years (see Kar & Bhaskar, 1982; Appayya, 1985; Madhyastha *et al.*, 1986; Rajagopalan *et al.*, 1996; Sharath, 2006). Recent reports suggest that the harvest of turtle eggs by humans (Sharath, 2006) and enhanced adult mortality caused by incidental capture in fishing nets (Rajagopalan *et al.*, 1996) are the most significant yet preventable threats facing sea turtles in Uttara Kannada. In addition, a number of other factors negatively impact the survival and reproductive success of adult sea turtles in both inshore and offshore coastal zones. Pollution from terrestrial sources (i.e. run-off in the form of marine debris and toxic chemicals), sand mining, eutrophication from mariculture, and the destruction of ecologically important habitats such as mangrove stands and other riparian zones alters the sensitive areas between river mouths that were once frequently visited nesting sites for sea turtles. Moreover, the collection of turtle eggs by humans and nest depredation by feral animals, in combination with the pressures of habitat

destruction due to unsustainable fishing practices, is leading to a potential loss of sea turtles from the Karnataka coast (Sharath, 2006).

Although there are a number of environmental protection laws which prohibit the exploitation of sea turtles and their eggs throughout India (*see the Wildlife Protection Act, 1972; the Coast Guard Act, 1978*) and across the world (*the Convention of International Trade in Endangered Species of Wild Flora and Fauna; the Convention on the Conservation of Migratory Species of Wild Animals; The United Nations Convention on the Law of the Sea*) top-down national legislation has little effect in the absence of consultation and cooperation at the community level (Upadhyay & Upadhyay, 2002). Field Services and Intercultural Learning (FSL) India<sup>1</sup> (Kundapur) and the Canara Green Academy (Honnavar) operate throughout Uttara Kannada, with the explicit aim of protecting turtle eggs from consumption and conducting awareness campaigns within coastal communities. These NGOs work closely with members of the local artisanal fishing community to implement environmentally friendly strategies for coastal development and to assist in the protection of key turtle nesting habitats.

### FSL's marine turtle conservation project

The Udupi District is located on the western coast of Karnataka and is punctuated by a number of river systems, which flow into the Arabian Sea. There are many small fishing communities situated on this 260 km long coastline and numerous commercial trawlers operate in the offshore waters. Beach surveys indicate that the olive ridley nesting season occurs across Udupi from September until

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February, with some seasonal variability in the peak nesting season.

The conservation strategies currently in operation mainly focus on enhancing awareness amongst local communities and empowering members of coastal villages to take an active role in the protection of their environment. Each year, up to 30 international volunteers are coordinated by 3 or more FSL staff; they also receive assistance from members of local youth groups and colleges to protect and locate nests, and conduct sea turtle conservation awareness programmes. A major role of the organisation is to prevent the harvest of turtle eggs by offering 2–3 times the market price; although the market price has apparently remained stable for the last three years at Rs. 1 per egg, prices can climb as high as Rs. 2.5 during times when fishing is poor. Once a nest has been located, care is taken to excavate and transport eggs to a nearby hatchery where specially appointed contact people from the local community can watch over them until hatching.

Information flyers are produced in the local language (Kannada) and distributed during weekly awareness campaigns. During each week of the breeding season, volunteers visit a number of nesting areas, reinforcing existing relationships with contact persons and forging new relationships with other representatives from surrounding villages. Local schools are also visited in order to conduct education and awareness programmes. In previous years, these visits have included presentations and student art exhibitions that depict the threats affecting sea turtles in Karnataka; theatre performances are also conducted by international volunteers to engage pupils and transcend differences in culture and language.

After the nesting season is underway volunteers actively build temporary information centers (one for every 5 kms of beach) and hatcheries in strategic nesting locations. These temporary structures contain information posters that describe the impacts facing sea turtles, the ecological importance of effective conservation practices, and the FSL contact number in the event that nesting tracks are discovered. The information presented in the following report is based on informal

discussions and observations during November–December 2006 along the Udupi coast.

## Results and Discussion

FSL India has been coordinating a turtle conservation volunteer project since November 2004. Since its inception, approximately 2348 turtle eggs have been collected from beaches across the Karnataka coast (Table 1). Koravadi, Bijadi, Kodi, Maravanthe and Navunda beaches are currently recognised as the most frequently visited nesting sites in the region 60 kms north of Kundapur.

**Table 1:** Data summary for FSL’s turtle project history in Karnataka over the past three years.

Year	Eggs collected	Hatchlings
2004	570	470
2005	823	584
2006*	955*	90*

\* - as of 19/12/06

Changes to land use and riparian habitat management, combined with incidental capture during commercial fishing and the harvest of turtle eggs by humans, is having a severe effect on the population of marine turtles that breed on this coast (Sharath, 2006).

Although our knowledge of the functional interactions that facilitate ecological relationships is limited, sea turtles are believed play a pivotal role in the transport of energy between terrestrial and marine ecosystems, and their continuing decline provides an indication of coastal health and our ability as resource managers to utilise the environment in a sustainable manner (Shanker & Pilcher, 2003; Shanker *et al.*, 2005).

From surveys conducted with commercial and artisanal fishermen it is widely acknowledged that the population of olive ridley turtles in Karnataka has declined over the past two decades. In the last five years national legislation preventing the sale or harvest of turtle products has been enforced in large harbours; however reports suggest that turtle eggs can still be purchased clandestinely in seaside communities and small sea ports. Most of the fisherman operating in Malpe harbor appear to be

aware of the laws prohibiting the sale of turtle products, however the rate of incidental capture during commercial fishing is still high (0 to 4 adults captured per day of fishing effort in purse seine boats) and unlikely to be mitigated by simply returning the severely stressed animals back to the water. If the introduction of turtle excluder devices (TEDs) cannot occur due to cultural, social or economical reasons, then other methods of reducing adult mortality need to be devised. Of the 34 fishermen interviewed in Malpe, approximately half had been involved in the commercial fishing industry across Karnataka over the past 10–20 years and all of these men commented decisively on the noticeable decline in the abundance of sea turtles that were encountered while fishing. Some even remarked that numerous dead turtles could be seen floating in offshore zones approximately 12–20 kms off the Karnataka coast, presumably those discarded from nets.

In addition to the loss of functional resilience and ecological imbalance which accompanies the decline of olive ridley turtles, future economic opportunities in the nature based tourism industry may also be jeopardised. Dolphins, whales, turtle nesting sites and coral islands can all be found on the coast of Karnataka in close proximity to the highly diverse forests of the Western Ghats. Ecotourism opportunities in this area have barely been explored and, if managed appropriately, are likely to yield fruitful opportunities for local employment, economic growth and sustainable development.

### **Recommendations**

*Data collection* – the locations of all nesting sites across the Karnataka coast should be mapped using GPS coordinates. A database with the dates that eggs were laid and hatched, as well as the clutch size and hatching success, should be maintained.

*In situ protection* – It is desirable to avoid moving eggs from their initial location, maintaining the optimal natural sex-ratio and incubation success rate of the nest *in situ*. As most egg predation appears to occur as a result of humans actively excavating turtle nests for sale or personal consumption (pers. obs), protecting the eggs *in situ* for two weeks after deposition so that embryonic

development can take place may be an effective deterrent against egg poaching.

*Habitat viability* – The trend of erecting sea-walls across the coast of India should be used only as a last resort. These structures have been shown to be ineffective as a means to prevent beach erosion in other countries and appear only to serve only as a short-term solution (pers. obs). Using introduced species (such as *Casuarina*) as a means to combat erosion is also undesirable when it causes reduced productivity and biodiversity as a by-product. At the very least, a protocol which prescribes the planting of *Casuarina* at a minimum distance from the mean high water mark is necessary. Ideally, the progressively replanting of coastal areas with native plants that mimic natural states in succession should be adopted. Implementing light and noise reduction strategies for coastal highways during the breeding season (e.g. use red visors on beach lights to minimise nesting interference from September to February) is also desirable.

*Community consultation* – Community awareness programmes that incorporate local youth groups and college students are perhaps the most interactive and effective means of introducing conservation values into the forefront of social consciousness. Groups like FSL make a significant contribution to sustainable development within local communities and should continue to work in an educational capacity by providing programmes that highlight the importance of the conservation and biodiversity while offering incentives for economically viable solutions to non-sustainable industrial practices.

*Forging networks* – A nation-wide communication network is required to link all NGOs and environmental agencies so that information and expertise can be shared and distributed in an easily accessible and scientifically rigorous manner. Including representatives from local industry in policy making processes and providing the opportunity for local business operators to assist those running conservation programmes is one strategy to draw support from the grass roots level.

*Future directions* – Conferences and annual workshops can be conducted with the aim of sharing information and providing opportunities

for participation and education. These meetings should also allow NGOs, governmental departments and stakeholder groups the opportunity to voice concerns and deliver progress reports concerning the state of conservation efforts in their local areas.

### Conclusion

Despite the limited nests recovered throughout Uttara Kannada, the efforts undertaken by various NGOs to mitigate nest predation and increase community awareness are not in vain. This work is crucial for sea turtle conservation in the coastal waters of Karnataka where multiple factors impact all aspects of sea turtle life history. Certainly the achievements being made here at a local level have effects which can permeate across socio-cultural

boundaries and empower local communities to work in coordination with conservationists and governments for a common goal.

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