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The Indian Ocean Turtle Newsletter was initiated to provide a forum for exchange of information on sea turtle biology and conservation, management and education and awareness activities in the Indian subcontinent, Indian Ocean region, and south/southeast Asia. The newsletter also intends to cover related aspects such as coastal zone management, fisheries and marine biology.

The newsletter is distributed free of cost to a network of government and non-government organisations and individuals in the region. All articles are also freely available in PDF and HTML formats on the website. Readers can submit names and addresses of individuals, NGOs, research institutions, schools and colleges, etc for inclusion in the mailing list.

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First report of twinning in the loggerhead sea turtle (*Caretta caretta*) from Ponta do Ouro, southern Mozambique

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Although widely reported, twinning in reptiles, and indeed in sea turtles is a rare event (Dodd, 1988; Hartdegen & Bayless, 1999; Tucker & Janzen, 1997). Twinning in *Caretta caretta* has previously been reported in the United States, Japan and Australia (reviewed by Dodd, 1988), and Cyprus and Turkey (Kaska *et al.*, 2000).

In this note, we describe what it is believed to be the first reported case in the Western Indian Ocean (WIO) region and possibly in Africa, of twinning in the loggerhead sea turtle (*Caretta caretta*). As part of a collaborative and concerted effort of various partners in southern Mozambique, more specifically between Ponta do Ouro and Cabo de Santa Maria (Figure 1), a nesting monitoring programme was implemented during the 2007/08 nesting season (Videira *et al.*, 2008).

On 8 February 2008, an unhatched egg with twin fully developed embryos was discovered at Ponta do Ouro (26°50.9S & 32°53.6E). A total of 9 unhatched eggs were also found, along with 1 dead hatchling, 1 pipped egg (dead) and 2 live hatchlings were also observed. A total of 72 eggs hatched successfully. The twin embryos were initially frozen and after measurements preserved in 96% ethanol.

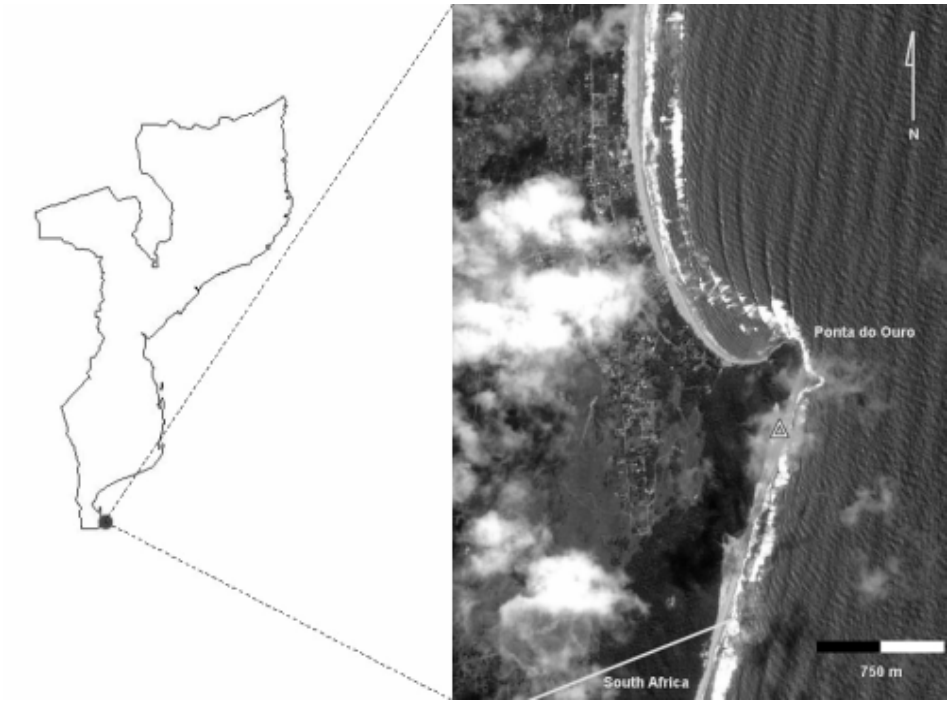

Figure 1: Schematic map of southern Mozambique, showing location of the nest where the twin loggerhead embryos were found (Δ).
Source: Satellite image adapted from GoogleEarth.

A. B.

Figure 2: Photographs showing the larger embryo (A) with five pairs of lateral and five central scutes and the smaller embryo (B) with four central scutes and six pairs of lateral scutes.
Photos: Marcos A.M. Pereira.

The embryos shared a common yolk sac. They differed substantially in size with the larger one measuring 41 mm curved carapace length and 37 mm curved carapace width. The smaller embryo measured 34 mm curved carapace length and 31 mm curved carapace width. The embryos also differed in the number of scutes. The smaller embryo had 6 pairs of lateral scutes and 4 central scutes (Figure 2A), while the larger had 5 pairs of lateral scutes and 5 central scutes (Figure 2B).

The causes of twinning in marine turtles are not yet well understood. Low temperatures have been suggested, but other environmental or genetic factors could also be involved (reviewed by Dodd, 1988). While twinning in loggerhead turtles seems to be more frequent than it is reported, we urge other researchers, especially in the WIO region, to pay more attention and report it in the literature. This could lead to possible comparisons between regions and research on the causes of this intriguing phenomenon.

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Sea turtle conservation in Sindhudurg district of Maharashtra

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Introduction

Maharashtra state, on the west coast of India, has a coastline of 720 km. Five coastal districts namely Sindhudurg, Ratnagiri, Raigad, Thane and the urban area of Mumbai share the coastline of Maharashtra. Of the five species of marine turtles occurring on the Indian coast, all except the loggerhead sea turtle have been reported from the coast of Maharashtra. Of these, the olive ridley alone nests sporadically along the entire coast (Giri, 2001).

In the past 15 years, various groups of researchers, state Forest Department officials and non-government organisations have been involved in the conservation and monitoring of turtle populations in Maharashtra. All the sites have recent nesting records. According to local communities, the population of turtles has declined in the last 10 years. At most of the sites, local people estimate that there were 15 to 20 nests each year, but now the number has reduced to less than five (Giri, 2001; Kakodkar, 2006).

Sindhudurg, the southern-most district of Maharashtra (15°35'N to 16°33'N and 73°18'E to 74°13'E), has a coastline of 121 km. The coastline is divided into three blocks namely Deogad, Malvan and Vengurla, from north to south. Malvan block is the most important fish landing area of Sindhudurg district, followed by Deogad and Vengurla. This district has a rich coastal environment and has a site that has been identified for the creation of a marine park and sanctuary.

Turtles in Sindhudurg

The leatherback turtle (*Dermochelys coriacea*) is locally known as '*Kurma*' and people from Sindhudurg coastal villages believe that it is the incarnation of Lord Vishnu. The olive ridley (*Lepidochelys olivacea*) is known as '*Tupalo*' and the rest of the turtles are generally referred to as '*Kasai*'. There have been no confirmed records of loggerhead (*Caretta caretta*) and hawksbill turtles (*Eretmochelys imbricata*) on this coast. Green turtles (*Chelonia mydas*) have been seen in offshore waters in the Vengurla and Malvan block. The encounters of green turtles seem to be higher towards the south. Olive ridley turtles are frequently encountered. There has been a report of a leatherback turtle encountered near the Malvan block. Encounters with turtles have been reported mostly in the post-monsoon season after September, although some locals believe that there is no particular season for nesting.

Trade in turtle products does occur along the Sindhudurg coast and some fishermen and local people participate in it. Most of the people who consume turtle eggs do so for the taste of the eggs. The eggs are sold at approximately Rs. 2 to Rs. 5 per egg. Turtle meat is also consumed but meat is usually not sold due to fear of the law. However, in some places a whole turtle is sold for Rs. 250-500; this has been reported mainly from the fishing town of Malvan. There are also superstitions about its medicinal value in treating bone disorders. The leatherback turtle is mostly not harmed due to religious beliefs.

The main cause of turtle mortality in Sindhudurg district is illegal gill net and trawl fishing in the offshore waters where turtles die as incidental catch. Despite bans on mechanised fishing in near-shore waters (10 fathoms) off the Maharashtra coast, trawlers continue to operate, and mortality has risen alarmingly over the past years. The fishermen (mainly trawlers and gill net operators) mostly encounter marine turtles entangled in their gear in the morning or at night. Mortality also occurs due to ‘ghost fishing’ in rocky regions of the sea where fishermen use old

nets for lobster fishing, and leave their nets when trapped in rocks.

Fishermen are aware of the legal protection for marine turtles; they deny poaching of marine turtles and say they set turtles free whenever they get entangled in their fishing gear. Kunkeshwar and Tarkarli beaches in Sindhudurg used to have relatively good nesting of olive ridleys before the development of tourism, but nesting has since reduced considerably.

Conservation status

The potential sites for turtle nesting and conservation in Sindhudurg district are given in Table 1 (also see Figure 1). These sites have relatively high fishing activity. Malvan and Deogad blocks have a large number of fishermen practicing mixed fishing for different types of fishes. The fishing community in Vengurla is very small with mainly shrimp fishing.

Table 1. Potential sites for conservation of sea turtles in Sindhudurg district

No.	Blocks	Villages
1	Deogad	Vijaydurg, Padvane, Deogad, Kunakeshwar-Katvan, Tambaldeg.
2	Malvan	Achara, Vayangani, Tondavali, Talashil, Kolamb, Sarjekot, Deobag, Malvan, Tarkarli, Khavane and Kelus.
3	Vengurla	Mochemad, Shiroda-Aravali, Shiroda-Kerwada, Redi, Neevti, Bhogve and Vengurla.

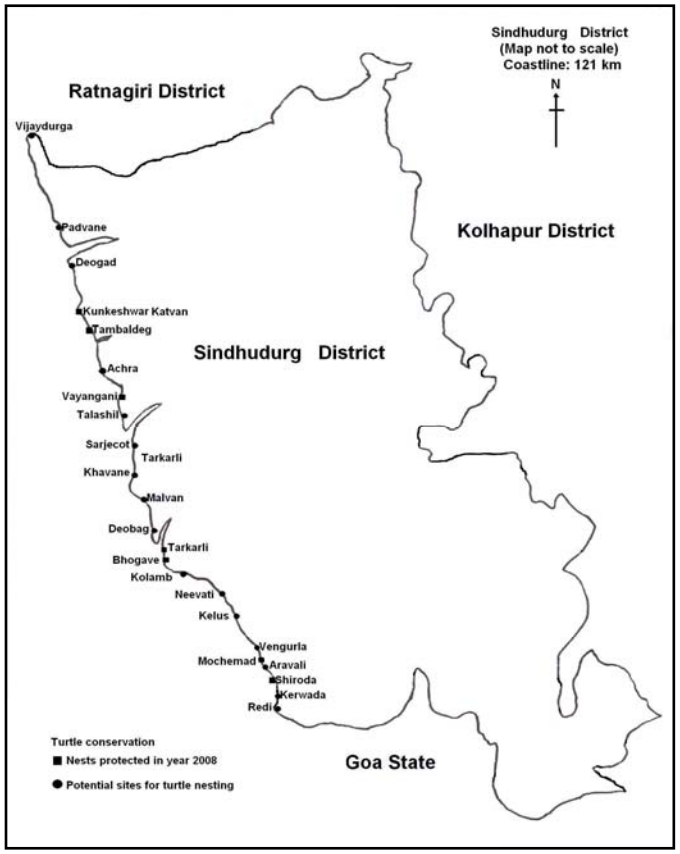

Figure 1: Map of Sindhudurg district showing turtle conservation sites in the region.

Sea turtle conservation along the Deogad coast was initiated by Dr. Daftardar, Professor at Shri. S.H. Kelkar College, Deogad, along with the Bombay Natural History Society (BNHS). The Maharashtra Forest Department, also along with the BNHS and local conservationists in Sindhudurg undertook sea turtle conservation in Deogad block. In 2002-03, actual protection work was started at Tambaldeg village and till date 1600-1700 hatchlings have been released safely. Locals from the village take responsibility for nest protection on the beach. Located nests are shifted to the hatchery and are protected with the help of the local community.

The Maharashtra Forest Department gives Rs. 500 to each person who locates a turtle nest. In places where fishing activity is minimal, locals can earn their livelihood through tourism and thus benefit financially from extending protection to marine turtle nests. Such programmes are worth trying at Kolamb, Bhogve, Tambaldeg and Padvane. Daily surveys must be carried out on the nesting beaches to find nests before poachers or predators do.

In 2005-06, Sahyadri Nisarga Mitra (SNM), an NGO based in Chiplun, Ratnagiri district, undertook sea turtle conservation in Sindhudurg district. SNM also arranged awareness programmes in potential turtle nesting beaches and villages on the coastline of this district. They conducted meetings with local people in different coastal villages and distributed information sheets to them. Posters about sea turtles and their importance were also displayed on some important beaches. The Bombay Natural History Society (BNHS), Mumbai has also been involved in turtle conservation along the Sindhudurg coast.

Current status

In 2008, 10 turtle nests were protected on various coasts of Sindhudurg. These nests were protected by local turtle conservationists along with SNM, BNHS and Maharashtra Forest Department.

Table 2. Nests protected along the Sindhudurg coast in 2008.

No.	Place	Nests protected
1	Katvan	1
2	Tambaldeg	2
3	Vayangani	3
4	Bhogave	1
5	Tarkarli	1
6	Shiroda	1
7	Mochemad	1
Total		**10**

Solutions are also available to many other problems of olive ridleys. Some areas that have less fishing activity and have potential as nesting habitats should be declared as community reserves. It is necessary to sensitise fishermen to check turtle mortality in fishing nets, and use of turtle excluder device (TED) by fishing trawlers may be considered. There is a need to develop guidelines to safeguard the species and minimise mortality caused by human activities. There is also a need to prepare guidelines for ecotourism in turtle nesting sites. In Maharashtra, activities like establishing turtle hatcheries, remuneration to the locals involved in this activity and preparation and distribution of material related to sea turtles is solely done by the contributions from the members of various turtle conservation groups. As the movement grows, financial assistance to support these activities is required.

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An update on marine turtles in Eritrea, Red Sea

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Introduction

Eritrea is located between latitudes 12°45'N and 18°03'N and 37°35'E and 43°07'E and lies on the eastern horn of Africa. Bordering the longest coastline of the Red Sea to the east, Eritrea has a mainland coast stretching over 1,300 km, adding to the 1,950 km of the additional coast of over 350 offshore islands, which include the offshore archipelagos of Dahlak and Hawakil and the Bay of Assab. Eritrea's extensive coast supports a rich array of natural systems including coral reefs, mangrove forests, beaches and seagrass beds, providing important foraging and breeding grounds for marine turtles. All of the species recorded in the WIO region occur in Eritrea's waters.

Five species of marine turtles reside in Eritrea's waters of the Red Sea. These include green, hawksbill, olive ridley, loggerhead and leatherback turtles. Three species – green, hawksbill and olive ridleys – nest. The green and hawksbill turtles are categorised by IUCN as endangered and critically endangered respectively, and are listed on Appendix I of CITES. The main threats to turtles in Eritrea are incidental catch in gillnets and trawlers, disturbance of nesting and foraging habitats, poaching of meat and eggs, lack of adequate protection, limited awareness and land-based development and pollution (Howe *et al.*, 2004; Teclemariam *et al.*, 2006).

The ECMIB Project Turtle Survey Team has been deploying the standard methodology of the regional conservation programme PERSGA for turtle surveys. At the beginning of the turtle survey, traditional ecological knowledge was explored and interviews were conducted with local fishermen and coastal residents which were then used as a basis for the survey. In this paper, we summarise the findings during the past five years of initial survey activities.

Exploitation of turtle products

Although there are few records of harvesting, egg and meat of sea turtles are consumed locally by communities and fishermen at a subsistence level. Earlier, carapaces of hawksbill turtles were exported for ornamental purposes. Turtle oil is valued for medicinal purposes, as it is believed to cure several ailments. Some communities also use carapaces for carrying goods for the household. Although not sold in local markets, carapaces can be observed on walls of restaurants as souvenirs and curios with different paintings on them (especially in the coastal cities of Assab and Massawa). The blood of sea turtles is believed to treat skin diseases. Diabeties, flu, TB and asthma are some of the diseases believed to be treated with turtle products (fats/oil). The consumption of dried sexual organs of male turtles mixed with honey and butter is believed to have aphrodisiacal properties.

It is not common to get huge economic returns from turtle products, but sometimes turtles are killed for their fat to generate oil which is sold within and outside the country (e.g. Yemen) for large sums of money for medicinal purposes. This is illegally practiced on remote offshore islands. Most of the nesting beaches are found on offshore islands, and only those that are near fishing camps and coastal villages such as Berasole and Ras Tarma (southern Eritrea Red Sea) are easily accessed. The pressure on green turtle populations is high, since they are prized for their meat products.

Nesting

Turtle nesting habitats have been recently identified and most of them are offshore. All of

the nesting beaches are inaccessible by cars/vehicles (offshore islands). The major nesting sites include Mojeidi, Dissei, Aucan, Dahret Sigala, Fatuma Island, Dehil, Urubia, Ras Tarma, Salafi (Berasole) and Gahro. The hawksbill turtle is the most common species in Eritrea and nesting has been recorded in more than 110 islands and coastal sites. The green turtle is the second most common species in terms of nesting. Little is known about the status of olive ridleys although they have recently (2004) been reported to nest. Loggerhead and leatherback turtles are relatively rare in Eritrea and there is no indication that they nest (Pilcher *et al.*, 2006a).

Tagging

47 and 96 nesting female hawksbills were tagged with a titanium tag (with a return address to Eritrean Ministry of Fisheries) during 2006 and 2007 respectively, in the Island of Mojeidi. Four hawksbills and one olive ridley were also tagged in different coastal areas of Eritrea. No tag return has been observed yet. The plan is to tag turtles, especially greens, on board shrimp trawlers in order to elucidate their migration routes.

Incidental catch

A total of 3342 cases of sea turtle incidental capture were reported during the ten years of record between 1994 – 2004 during fishing trips of industrial shrimp and fish trawlers operating in different fishing grounds of the Eritrean Red Sea. Green turtles were more frequently caught than the rest of the species. 1819 green, 133 hawksbill, 30 loggerhead, 39 leatherbacks and 3 olive ridley turtles were trapped as incidental catch. The remaining 1128 turtles were unidentified. Of the total, 690 were dead and 2462 were returned alive. The percentage survival rate of the incidentally caught turtles was 78 %.

A survey was also conducted by a sea turtle team within four Egyptian vessels from 09/12/04 to 12/02/05 to assess the potential threat to sea turtles in fish and shrimp trawlers. During the trawling operations, 21 sea turtles were incidentally caught, of which one green turtle was found dead and the rest alive.

Almost all the fishing gear used by the local fishermen are gill nets and hooks & lines; there was no incidental catch except in rare cases of net entanglement. The fishermen said that wide-mesh nets and many kinds of gill nets also entangle turtles. At most, three to four in a year are caught entangled in drift nets according to interviews conducted in December 2004. Most cases of turtle slaughter in the southern Red Sea region are due to entanglement of turtles in gillnets and driftnets. It is very common to see carapaces of killed green and hawksbill turtles along the coastline of the southern Eritrean Red Sea region.

Management

Although conservation and management efforts are underway in some areas of Eritrea including the offshore islands of Dahlak, Hawakil and Assab, the conservation status of marine turtles in Eritrea remains largely unknown. Management options to reduce incidental take of marine turtles in fisheries, notably trawlers and gillnets, include the use of excluder devices, reducing tow or soak times, and restricting use of threatening fishing gears in important turtle habitats.

Policy

The 1998 existing Eritrean fisheries proclamations No. 104/1998, prohibit direct harvest and domestic trade in endangered and protected species generally including marine turtles, their eggs, parts and products; and to protect important turtle habitats. As stated in Article 12,

1. No person shall fish for any marine mammal or other protected species in Eritrean waters.
2. Any marine mammals or other protected species caught accidentally shall be released immediately and returned with the least possible injury to the waters from which it was taken, whether dead or alive.

And according to the Legal Notice No. 39/1998 under Protected Species, Article 11,

All species of marine turtles are protected species for the purposes of article 12 of the Proclamation; and accordingly fishing for marine turtles in Eritrean waters is prohibited.

The regulation states that fishing vessels operating in Eritrean waters must restrict their fishing activity in authorised zones; for trawling, this is 4 miles from islands, 8 miles from the mainland coast, and the depth must be greater than 30m, where the probability of catching sea turtles is very low. Zoning and seasonality of fishing is worked out by the Ministry of Fisheries regulatory body. It also states that fishing vessels operating in Eritrean waters must use TEDs in all trawl nets to reduce the mortality of turtles and other megafauna. But this is not yet practiced for a variety of reasons. The use of poisonous chemicals and explosives to kill, stun or disable fish or other aquatic organisms in order to catch them more easily is strictly prohibited under the proclamation.

The Ministry of Fisheries has also issued a coastal policy that will regulate all activities along coastal areas. It will allow coastal developments 100m (setback) from a geologically fixed point along the coast.

Action plan

Eritrea developed a national action plan, a set of key management measures, that could eventually serve as a basis for a more specific action plan at a national level, but this is still a draft (2005).

The development of a National Action Plan for Marine Turtles in Eritrea (drafted in 2005) will consider all critical habitats. Those critical habitats that are outside protected areas can be stated as sanctuaries and be regulated. Although some areas are proposed as protected areas, they are not officially established yet. Marine turtles also feature prominently in plans to set aside marine protected areas which will safeguard these resources and leave behind a longstanding legacy for future generations.

Awareness

The ECMIB Project, in collaboration with national organisations, has conducted awareness seminars. Groups that have been the targets of these focused education and awareness programmes include policy makers, fishing industry, local/fishing communities, indigenous groups, media, teachers, students, military, navy and the police from different coastal areas of the country. Turtle posters and brochures in three languages (Tigrinya, Arabic and English) and banners were displayed and distributed. Seminars, general knowledge contest programmes among school children and sport activities were some of the turtle activities conducted which were broadcast on national TV and radio news. Clean up activities have also been carried out on nesting beaches by the Turtle Team of the project, students and youth.

To increase understanding of and to create awareness about sea turtle conservation in coastal and island communities and relevant governmental and non-governmental organisations, the Year of the Turtle 2006 was commemorated in the month of October 2006.

The ECMIB Project Turtle Team has deployed a seaturtle club in the town of Assab in collaboration with the National Union of Eritrean Youth and Students (NUEYS). The town of Assab is one of the active Eritrean coastal areas with a lot of fishermen and a landing site for fish. There is still an illegal market for turtle meat in the area. Teaching the children of these fishermen will indirectly help make elder fishermen aware of these issues. The ECMIB Project has equipped the 'Bisa Club' with some educational and recreational materials such as satellite dish and TV for turtle (environmental) documentary film shows.

School children have been and are displaying marine turtle posters, carapaces and skulls at several local and national occasions, such as sport, art and youth festival weeks.

Turtle activity news (technical information) including some findings and the unusual level of mortality papers have been posted on the IOSEA website, seaturtle.org and on the pages of the Eritrean Red Sea biodiversity website (http//: www.eritrearedsea.org).

Capacity enhancement

The ECMIB Project has trained its staff both inside the country and abroad with the Cyprus wildlife Society in 2005 on turtle nesting biology and conservation, and with Turtle Conservation Project (TCP), Sri Lanka in 2006 on socioeconomic aspects and conservation of turtles. More than 25 biologists were also trained in the theory and practice of sea

turtle biology and conservation in 2004 by Dr. Nicolas Pilcher, sea turtle biologist and Co-Chair of the Marine Turtle Specialist Group (MTSG), IUCN, during which the first record of olive ridley nesting was documented (Pilcher *et al.*, 2006b).

A four-day sea turtle field training course was given to 15 observers on board industrial shrimp/fish trawlers by the ECMIB project (Ministry of Fisheries) sea turtle conservation team. The academic training held at Dissie Island from 3 to 6 January 2007 was complemented with practical demonstrations during the day and at night. Each trainee was given a copy of the Indo-Pacific marine turtles and other marine mammals' identification key with photos, along with measuring tapes which can help them identify the species easily.

Illegal trade

All international trade is prohibited according to CITES (as Eritrea is a signatory). There are no cases reported to the Ministry of Fisheries on such incidents. Domestic illegal trade of turtles is forbidden according to the existing Eritrean fisheries regulations. There are rare reports that turtle products are sold illegally. However, implementation gaps still exist as few measures have been applied. Nevertheless, training and education/awareness programmes are continuing to reduce the incidence of illegal trade.

Conclusion

The survey activities conducted by the ECMIB Project have been successful in identifying the nesting sites of marine turtles. Although surveys and assessments have been carried out to some extent, it was not conducted on a regular basis. The absence of specific turtle programmes has resulted in fragmented turtle assessments. Additional surveys are necessary to identify the feeding grounds and migratory routes so that conservation efforts can be effective. Eritrea is pushing to strengthen cooperative management of shared populations within the region, and, where appropriate, formalise cooperative management arrangements at national and regional levels, which will develop, where appropriate, transboundary marine protected areas using ecological rather than political boundaries.

Although no major work has been conducted with indigenous communities so far, in the future it is planned that greater effort will be put into incorporating communities in conservation. Frequent meetings with the *Derrder* (Sultan) of the indigenous community of Afar has resulted in reduced levels of turtle killing in some areas.

Future plans include training of fishermen from different coastal villages of the Eritrean Red Sea on identification, nesting biology, conservation and turtle death mitigation techniques; conducting workshops for different governmental and nongovernmental organisations on how to save marine turtles; preparing training material in different local languages; and turtle handling manuals for students and fishermen. Efforts will be made to establish a library in the turtle clubs.

Finally, since the ECMIB Project was terminated in November 2007, the Ministry of Fisheries will continue the responsibility. The main challenge will be to identify available funding sources at a number of levels, including government and inter-governmental organisations (e.g. Ministerial, Global Environment Facility, UNEP, UNDP, Overseas Aid packages), non-profit organisations (e.g. WWF, IUCN, Ramsar), and private foundations.

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Advances in sea turtle conservation in Kenya

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Introduction

Five of the seven extant sea turtle species are reported to occur within Kenyan waters: green, hawksbill, olive ridley, loggerhead and the leatherback turtles. The green turtle *(Chelonia mydas)*, hawksbill turtle *(Eretmochelys imbricata)* and olive ridley *(Lepidochelys olivacea)* are the most commonly encountered species in Kenya (Wamukoya et al., 1997). However, the loggerhead *(Caretta caretta)*, and the leatherback *(Dermochelys coriacea)* are rarely sighted though past records indicate that they used to occur within Kenyan waters: with the first ever-confirmed leatherback stranding reported in 2007 (Wamukota, 2007).

Sea turtle populations in Kenya have been facing several threats, which have ranged from direct subsistence harvesting for meat and eggs, commercial harvesting for meat, oil and shells (Wamukoya et al., 1997; Church & Palin, 2003), incidental capture in both artisanal and commercial fishing activities to habitat alteration, degradation and loss. The status of sea turtle exploitation in Kenya spells a major challenge to conservation and management efforts especially given that a large percentage of mortalities are human caused and mitigation measures partly involve major socio-cultural as well as socio-economic shifts.

Despite sea turtles being classified as 'protected animals' under the Wildlife Act (Cap 376) and Fisheries Industry Act (Cap 378); legislation that prohibits and makes it an offence for any form of direct exploitation of the animal or its products under Kenyan laws, illegal harvesting and exploitation of the species still thrives unchecked. This trend is compounded by the lack of resources such as equipment, personnel and finances to implement the already established legislations. Furthermore, no legislation exist at present to protect key sea turtle habitats such as foraging or nesting grounds except for those falling within designated marine protected areas.

Sea turtle conservation in Kenya

Sea turtle conservation efforts in Kenya are coordinated by the Kenya Sea Turtle Conservation Committee (KESCOM) Secretariat. The secretariat was founded in 1993 to fulfill the need for a national multi-sector partnership that aimed at bringing together all stakeholders from local

communities, government institutions and private agencies in support of the conservation and management of sea turtles in Kenya.

KESCOM has, and continues to strive to promote a national and regional integrated approach that contributes towards global efforts in sea turtle conservation. This approach is guided by the following four broad objectives; development and implementation of awareness and research programmes, capacity building of turtle conservation groups and local communities, encouraging and enhancing community participation and liaising with conservation partners at the national, regional and international level to promote the conservation of sea turtles. The establishment of the committee followed increased reports of sea turtle mortality mainly occasioned by fishing activities, poaching, and trade in sea turtle products and a regional acknowledgement that populations were declining not only within the Western Indian Ocean region but also globally.

One of the major daunting tasks that KESCOM had to overcome upon its inception was trying to encourage the local communities to support sea turtle conservation initiatives against a backdrop of limited livelihood options. However, due to an increase in advocacy and awareness campaigns, there was increased support not only from the local community, but also cooperation from government institutions and NGOs as well as private interests and volunteers.

Sea turtle conservation efforts in Kenya have focused more on local coastal communities for two key reasons. Firstly, local communities remain the most intimately linked with the sea turtles and their involvement in sea turtle conservation initiatives has been identified as one of the major recurrent themes in the global strategy for the conservation of sea turtles (IUCN, 1995). Secondly, there is a general recognition that whether local, regional, and even global efforts to protect sea turtles and their habitats succeed or fail depends to a larger extent on the active involvement of informed and empowered local coastal communities (Renard, 1991; Limpus, 1995; Humphrey & Salm, 1996).

To date, KESCOM has supported the establishment of a total of eighteen community based Turtle Conservation Groups (TCGs) who are involved in sea turtle conservation work. This has been based on the recognition that successful conservation programmes must have the support of local communities. Through these groups, KESCOM has been able to conduct the following activities, which have contributed directly to the fulfillment of objectives related to the recovery of sea turtle populations locally and regionally:

Habitat protection and restoration

Community Turtle Conservation Groups (TCGs) have been involved in habitat protection and rehabilitation activities, which have included mangrove reforestation and habitat surveys. Communities have also been educated on wise use of coastal resources and better fishing practices to minimise human impact on sea turtle habitats. KESCOM has liaised with TCGs to provide advice to hotels and other private interests regarding appropriate methods of beach protection (alternatives to seawalls and beach lighting).

Coastal clean-ups

Coastal pollution and especially poorly disposed plastics continue to pose a major threat to the survival of sea turtles, especially in their foraging and nesting grounds. KESCOM has, and continues to organise and hold together with TCGs members regular beach clean-up exercises. The garbage/trash collected is weighed and categorised to determine major ocean polluters. This exercise has ensured that the local people take part in reducing threats to sea turtles posed by pollution and serves as an awareness tool on the importance of pollution control. Hotels are also involved in beach clean-ups and other pollution control measures especially with regard to sewage disposal. This activity contributes directly to global efforts aimed at restoring the value of coastal environments through the annual International Coastal Clean-ups organised by the Ocean Conservancy. Some of the garbage collected is recycled and utilised to make handicrafts such as earrings, key holders, penholders, etc. that provide

an additional source of income to local community members.

Beach patrol/monitoring activities

KESCOM has, and continues to support the implementation of beach patrols and monitoring programmes. This has been through training local people on techniques of standard beach patrols, surveys, and monitoring activities for the purpose of improving the quality of reported data and information. These programmes have promoted collaboration with local fishermen who have ensured and supported the success of sea turtle release programmes for turtles caught accidentally in fishing gear. Another output of these programmes has been the support for the establishment of community groups to promote conservation of marine resources in newly characterised nesting areas and adjacent waters.

The programme has reduced incidents of poaching (of nesting females, and eggs) due to increased surveillance, and has contributed to higher recruitment rates through nest and nesting females protection programmes.

Capacity building

Capacity building for TCG members has been in the provision of basic and quality environmental leadership training in sea turtle biology, habitat rehabilitation and project management to influence conservation at the local grassroots level.

Public education and awareness

KESCOM has always recognised that the implementation of resource conservation and management initiatives requires education and awareness in order to enhance local action/community participation in the conservation process. This has been guided by global realization that the inclusion of environmental concerns in the consciousness of the average citizen is crucial to the sustained survival of both human residents and wildlife. Conducting awareness and education programmes has been core to the success of KESCOM's objectives. Sea turtles have served as good candidates for public education campaigns since they are flagship species (Frazier, 2005), whose populations are affected by the health of coastal ecosystems, both marine (coral reefs, sea grass) and terrestrial (sandy beaches, littoral zones). KESCOM has developed and implemented a targeted (schools and local communities based) mobile public awareness and education campaign to accompany conservation action, targeting relevant stakeholders (specifically or collectively) and embraced all available avenues of communication, including print and electronic media, school curricula, extension programmes, public displays and local gatherings (e.g. festivals, political events, town and village meetings).

Income Generating Activities (IGAs)

The over-reliance on and harvesting of marine species by coastal communities for sustenance is one of the challenges experienced by KESCOM. The main challenge is attempting to encourage communities to be involved in sea turtle conservation initiatives against the backdrop of limited livelihood options. Anecdotal reports have indicated that fishermen have resorted to poaching sea turtles in the event of inadequate fish catches, although some poach turtles because of a long term traditional believe that sea turtles have medicinal as well as aphrodisiac properties.

KESCOM has facilitated TCGs members from various areas to identify and even initiate income generating activities (IGAs). These IGAs have not only proved essential for the conservation of marine and coastal resources and ecosystems but also for the overall development of local communities.

Conclusion

The results of conservation action at the local level contribute directly to the national database and information center based at Mombasa. The database is relied upon in informing national sea turtle related policy and legislative issues / reviews, and regional initiatives through the IOSEA MoU, nested within the Nairobi Convention.

However, the impact of these activities on the overall goal of sustainable sea turtle populations in Kenya has been limited due to factors ranging from

availability of resources to insufficient involvement of major stakeholders, especially local communities. The nature of these limitations suggests that the steps in enhancing sea turtle conservation in Kenya would include increased community participation in sea turtle conservation and the development and implementation of strategies to make marine conservation, in general, more integrated and pro-active by utilizing sea turtles as a flagship for marine conservation. The fact that sea turtles are migratory and are impacted by many coastal activities including fishing, tourism and coastal development indicates that effective management programmes would have to take into consideration broader coastal marine development issues.

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Coastal development in South Africa
Implications for sea turtle conservation

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As an introduction it must be pointed out that South Africa is a marginal country for sea turtles and is host to the southernmost nesting populations of loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) turtles in the world. Both species nest on the east coast immediately south of the border with Mozambique, with which country the two nesting populations are shared.

South Africa, like many countries, went through a long phase of unplanned coastal development with predictable results where developments encroached on beaches. Recent extreme weather events have caused extensive damage in many areas. Over the past 50 years, a series of more effective coastal planning legislation has been promulgated and this has greatly improved development impacts. However, South Africa shares the problems of many developing countries when it comes to mega-projects, be they harbours or industrial complexes. The sheer magnitude and costs of such schemes overwhelms legislative controls accompanied by the granting of exemptions from normal restrictions, all in the "national interest".

The benefits of long term planning

When the regional conservation authority of the day, the Natal Parks Board, became aware that there were sea turtles nesting on the beaches under its jurisdiction (then the province of Natal), it was fortuitous that the area was very remote and completely undeveloped. Access to the beaches was difficult in the extreme, requiring many hours of travel over unpaved roads and bush tracks and necessitating the crossing of large rivers by boat.

When the first turtle season had been investigated it was decided that obtaining formal protection for the nesting area would be a priority. The first proposal to have the beaches included in a marine reserve was made in 1966 but there was little official state interest because the area was under the control of the Central Government Department of Bantu Administration. It was only through the Department of Sea Fisheries that the first section of the coast was declared as the St. Lucia Marine Reserve in 1976 with the most important sea turtle nesting beaches being included in the Maputaland Marine Reserve in 1979. In a parallel move, the coral beaches offshore and the adjacent coast were registered as a Ramsar site. Thereafter followed another two achievements which saw the terrestrial area adjacent to the beaches proclaimed in 1984 as the Maputaland Coastal Reserve by the then Bureau of Natural Resources of the KwaZulu Self Governing Territory and later in 1990 the former Sodwana State Forest was incorporated into the Greater St Lucia Wetland Park.

In 1999 the Greater St Lucia Wetland Park in its entirety was listed as a World Heritage Site (Natural) making the management of the sea turtles accountable to the global community. This is the highest level of protection that any country can achieve for its biodiversity. As a closing note the name of the protected area has been changed in 2007 to the iSimangaliso Wetland Park.

The World Heritage Site listing effectively provides global protection to a site as the signatory country is now accountable to the World Heritage Site Convention which, if linked with the country's membership of the Convention on Biodiversity, the Ramsar Convention, Cites and CMS all emphasise the value of the site and the animals associated with it.

The necessity for public awareness

For most elements of biodiversity conservation, and that certainly includes marine turtle conservation, it has proved essential to pursue the Precautionary Principle with dedication in order to

ensure the highest degree of protection. In South Africa's case, the marine turtle beaches are now totally contained within a World Heritage Site and theoretically buffeted against undesirable development threats by a broad selection of binding and non-binding instruments, one of which is the IOSEA Memorandum of Understanding.

However, before all these instruments were in place there were regular threats to the beaches which survived through combinations of the protection measures in place at that time along with a constantly strengthening public awareness and support for the nesting turtle populations.

The first threat was a political move to give Swaziland access to the sea through South African territory in order to develop a deep water harbour, the mouth of which would have been situated right in the heart of the most densely utilised loggerhead nesting beaches. The public (see for example Hughes, 1982) and political outcry over this project resulted in the State abandoning the concept. This was followed in 1993 by the refusal of a heavy mineral sand mining concession in the south of the protected area and, as a result of the consolidation of the diverse sections of the Park, the very positive timed removal of exotic timber plantations established by the Department of Forestry in earlier years. All these results, achieved through an aware and concerned public, have greatly enhanced the integrity of the protected area.

Development by choice

Having placed the entire South African nesting beaches within a formally protected area managed by a responsible conservation authority, it has proved possible to dictate, to a satisfying degree, the speed, models and scale of developments. Within South African protected areas all developments are controlled through appropriate management plans. It is therefore possible and practicable to define the conditions under which tourism developments may proceed.

In the specific case of the turtle beaches, apart from the St Lucia village (a local authority established long before the discovery of the value of the adjacent beaches as turtle nesting grounds, and now completely surrounded by the protected area) there are both private sector and public sector tourism developments. In South Africa, there are a number of conservation authorities that enjoy para-statal status and run extensive tourism businesses, the profits of which are used to support conservation. In KwaZulu-Natal, the income derived by Ezemvelo KZN Wildlife (the successor to the Natal Parks Board) from business activities runs into millions of Rands per year.

However funded, all tourism developments must meet strict standards:

- The development must be limited in size – generally less than 200 units.
- No high rise designs.
- The development must be well setback from the beaches. Presently, these setback lines are set at hundreds of metres.
- Construction must be of natural materials (thatched roofs, wooden or reed walls).
- Waste disposal must meet extremely high standards.
- Energy saving measures must be part of the design.
- The management of tourists must be defined in the master plan especially those involving interaction with the sea turtles.
- Private sector developments must include an arrangement with the local community to guarantee benefits either through profit sharing or equity (shareholding).

Ezemvelo KZN Wildlife has an extremely successful system which levies modest charges on every tourist activity and the funds are channeled into a Community Development Fund. Since introduced by the Natal Parks Board in 1998 this Fund has provided over R 30 million for community projects.

Turtle tour concessions

Additional values of private sector development lies in their involvement in turtle protection and research. Within the protected area certain private sector facilities are so situated that they can operate turtle tours during the nesting season. There is considerable competition for turtle tour concessions and they are eagerly sought after as high value assets.

Each year, the three available concessions have to be tendered for and are annually attracting higher fees, those in the premier sections of beach paying as much as R 100 000 for a concession. Once a concession is granted, the private sector staff has to undergo training in order that they are fully integrated into the seasonal research and monitoring programmes. Staff tag nesting turtles, record their statistics and record all nests and tracks. All such records are regularly submitted to Park researchers. In addition, the presence of tourists on the beaches acts as a deterrent to would-be poachers and reduces the destruction of nests by feral dogs or even more natural predators such as jackals.

If the concession is very successful, as most are, there are often bonus benefits such as voluntary contributions towards the turtle project. These take many forms; paying salaries of local staff, the purchase of equipment such as tags and satellite transponders, sponsorship of local school educational programmes and the raising of funds from tourists who are often only too willing to make a contribution to the turtle work.

It is noteworthy that immediately north of the border in Mozambique (which shares the nesting populations) several private sector operations carry out sea turtle monitoring programmes at least one of which has direct links with the South African programme using flipper tags from the local programme. At the end of each season a full report is supplied to the mother programme and the data integrated into the South African report.

It must be concluded that the inclusion of the research and monitoring programmes in the publicity materials of the concessionaire has proved of great value but not as much as the public support derived from direct participation in the turtle work. Such participation has been beyond price.

Public awareness

Successful turtle conservation depends to a very marked degree on high levels of public awareness. As mentioned above, over the past forty five years the support and empathy derived from influential citizens (political, public and private) has helped enhance the integrity of the protected area and ensured the maintenance of the turtle beaches in a pristine state. In South Africa, the sea turtle has achieved an icon status as a result of the programmes to enhance public awareness through education, publicity and participation. All this has been achieved in a country which is a marginal sea turtle habitat.

Recommendations

The recommendations are:

- Plan for the long term; it is never too early to start calling for enhanced protection.
- Mobilise every possible conservation and protection instrument, local, national and global.
- Publicise the turtle programme, especially to influential politicians.
- Encourage public and private sector involvement in the protection programme.
- Encourage, dictate and control tourism developments.
- Integrate tourism activities into turtle conservation programmes. (However, take care not to introduce tourist activities that put the turtle populations at risk).
- If at all possible, structure conditions attached to tourism that promotes flows of real benefits to local communities.

Conclusions

There are encouraging signs that in other countries in the south western Indian Ocean similar programmes are bringing benefits to nesting sea turtles. There are numerous protected areas with monitoring showing clear signs of increasing populations and there are many programmes where tourism is being of great help with private sector operators taking the initiative to protect nesting turtles.

However, there are problems as coastal development planning is still weak in Mozambique and Madagascar and there are plans to develop a deep water harbour in southern Mozambique

which, if built, will definitely influence the future survival of nesting sea turtles in Southern Africa. On the other side of the coin Mozambique is about to declare a huge marine reserve which will include the Primeira and Segundo Islands north of the Zambezi River estuary which will include green and hawksbill turtle nesting beaches.

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Local communities and the Dharma debate: An interview with Mangaraj Panda, Coordinator of the OMRCC

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The most audible opponents of the Dhamra Port project have been conservation organisations such as Greenpeace, turtle biologists and environmentalists from across the country and beyond. The positions of some of these organisations have been recorded in previous issues of the IOTN (Issue 1 and 8). Most of these groups are galvanised into action around the impacts this port poses to the olive ridley turtles that come to this region. The main point of contention is that this port, located on the Orissa coast is minor only in classification[1] and in reality will have several negative impacts on the ecosystems of the region.

This port project along with several coastal infrastructure projects has been opposed by fisherfolk organisations who believe that these projects negatively affect the traditional fisher communities of the region. The National Fishworkers Forum and the Orissa Traditional Fish Worker's Union have documented their protest against the Dhamra Port project.

The Orissa Marine Resources Conservation Consortium (OMRCC) is an independent body comprising of traditional fishworkers, scientists, civil society organisations and individuals concerned with the conservation of marine resources and livelihood security in Orissa's coastal areas. The Orissa Traditional Fish Workers' Union (OTFWU) is a member of the OMRCC. I interviewed Mangaraj Panda, the Convenor of the OMRCC who spoke about the opposition to the Dhamra port project and the nature of the agitation against it.

Aarthi Sridhar: From your point of view, what will be the impacts of the Dhamra Port on the marine life, ecosystems and livelihoods?

Mangaraj Panda: The Dhamra port is very close to the Gahirmatha Marine Sanctuary, so definitely it will have a negative ecological impact especially on the endangered (saltwater) crocodile, horseshoe crab and olive ridley turtle. Definitely, the people who depend on coastal and marine resources will be deprived and only outsiders who are technically sound - technical experts will get benefits from this. The others whose literacy level is low, and who don't have any expertise in any other sort of income generation other than fishing, will be deprived and they will become the servants of those officials and officers and the women will become housemaids to earn a livelihood. All sorts of notorious elements will arrive such as stevedore

[1] According to the Indian Ports Act, any port governed by the State Government is classified as a minor port and other ports are classified as Major Ports.

companies and this increase will mean that the number of conflicts will increase leading to more internal conflicts. The local people will be victimised.

Aarthi Sridhar: What is the position of the fisher organisations, both trawler as well as the traditional fisher communities?

Mangaraj Panda: Now actually there is an illusion among the trawler owners that they will get a better place to berth their vessels. The Paradip Port Authority (a government undertaking) planned a harbour for the trawlers when the Paradip Port was being built, to enable them to berth their boats upon payment of fees, to undertake regular dredging and so on. Private ports will not do such charity and they will not give such free services to the trawlers. So they are also going to be victimised. But now there is an illusion that they will get better services and get provisions if the port comes. If a government owned port does not allow the traditional fishers to enter their port, how will a private port allow them? This is the general logic, and both the trawlers and the traditional fisherfolk will be victimised.

Aarthi Sridhar: What has been the nature of the agitation against this port?

Mangaraj Panda: Because there is this illusion going on, the agitation at this point of time is on a very low scale, but those who understand the internal dynamics are quite keen on supporting those who are against this port project. A number of groups have expressed solidarity with Greenpeace in its opposition to this project. So definitely people will support anyone who comes and encourages people; who express their opposition to this project, keeping the interest of local and traditional inhabitants in mind. Then, people will definitely react against this port project.

Aarthi Sridhar: What do you think of the IUCN's involvement with this Dhamra Port?

Mangaraj Panda: It is controversial. The Indian bench of the IUCN is already divided and as for Co-Chair of the Marine Turtle Specialist Group, IUCN - his statement and his involvement - without taking the support of local MTSG members; his statement is really pathetic and unwarranted.

Aarthi Sridhar: What is the role of the OMRCC and what is it going to do in future about this project?

Mangaraj Panda: As per our mandate we support traditional fishworkers in their livelihood and we know that this port will affect their livelihood like in the Paradip port area where they *have* been victimised, and in the Gopalpur port area where they are *going* to be victimised. We have also seen why the fisher people agitated against the Gangavaram port in neighbouring Andhra Pradesh and how they were affected by this project. All these instances are with us in the OMRCC and we are educating the OTFWU who is a founder member of the OMRCC. Definitely the OMRCC will stand by the OTFWU and the traditional fishworker people. We will support their decision and their actions and we will continue to encourage them to react against this port project.

Aarthi Sridhar: As a person from a civil society organisation (the United Artists' Association), as a person who has worked with fisherfolk communities and as a Convener of the ORMCC, what are your concerns about the perspective of the Orissa government on coastal livelihoods and development?

Mangaraj Panda: The Government of Orissa has become a government for corporates, mining agencies and multinationals. Today if I go to the Government of Orissa with a good proposal saying that I will invest 'x' millions of rupees, the Government of Orissa will invite me, house me in their guest house, and treat me like a big boss and they will provide me what ever I demand. This is what is happening literally throughout the state now. There are different political parties in Orissa. Whether the Congress, BJD, or BJP - whoever comes to the chair - for their personal interest, for their party funds, for their election campaigning expenses, definitely they will go the way of the corporates and industrial houses. Nobody will think of poor people. This is the behaviour of all parties. When politicians are in the opposition party, then they express solidarity with the people. For example, when the National Fishworkers' Forum went to Atal Behari

Vajpayee and L.K. Advani of the Bharatiya Janata Party when they were in opposition at the Centre, at that time the BJP expressed solidarity with the NFF, but as soon as they were in power, they had forgotten their stand, their support to NFF and their support for fishworkers and they acted to the tune of the corporates.

Aarthi Sridhar: How does the same case reflect in the local politics at Dhamra? At the POSCO site there was so much opposition, despite the local politics.

Mangaraj Panda: The way the local politics works is that people get involved in politics for personal gain. This is especially true of the non-traditional and non-coastal inhabitants - some literate, some semi-literate and even some educated people, who engage in this. This also includes people who think that political intervention will ensure them a berth in the company, and if they can spend some money, they can get a contractor-ship and make more money. There are also several people who stand to gain monetarily from creating a nuisance. Keeping this in mind, they are supporting the port project. However, ultimately they will suffer the consequences of this project once this port is established and their dream will be over.

End of Interview

Note: Harekrishna Debnath, the Chairperson of the National Fishworkers Forum noted in his letter to the Secretary of the Ministry of Environment and Forests *"The impacts of all this activity in this important fishing ground are going to be devastating. Despite this, the port has been accorded environmental clearance by your Ministry in 1997. It is our view that this environmental clearance given to the Dhamra Port is completely illegal. This port has been accorded environmental clearance several years ago based on an Environment Impact Assessment Report done by Kirloskar Consultants. This report is a shoddy EIA report and was meant for an earlier port design by the earlier project proponent. This EIA does not even attempt to assess the impacts on fishing communities and contains very poor information on the social and environmental impacts of this port on the fishing communities in this region. We do not accept this outdated EIA for the present project. There have also been no public hearings for this project despite this having significant impacts on fisheries."*

An update on Sahyadri Nisarga Mitra activities during 2007-2008

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Sea turtles

At Sahyadri Nisarga Mitra, we started the 'Marine Turtle Conservation Project' six years ago in Maharashtra. In 2007-2008, we have undertaken conservation and protection work at 30 villages in coastal Maharashtra and arranged awareness campaigns along the entire coastline of the state. A total of 159 turtle nests were protected and more than 3000 hatchlings were released during 2007-08. In the last six years, a total of 371 nests were protected and more than 13000 hatchlings were released safely into the sea. For the last three years, we have granted the 'Kasav Mitra Puraskar' (Turtle Friend Award) to individuals and organisations in recognition of outstanding work carried out for sea turtle conservation. In 2008, the award was given to Dr. Ramdas Mahajan from Kolthare (Dapoli taluk, Ratnagiri district of Maharashtra). A Gujarati translation of the book 'Sagari Kasav' (Sea Turtles) by Parthiv Sanghavi was also produced in 2008.

Over the last two years, we have organised an annual turtle festival at Velas village in Ratnagiri district, Maharashtra, in collaboration with the forest department and Gram panchayat of Velas. The main aim of this festival is to encourage the involvement of local communities in turtle conservation activities. Our attempt is also to increase the income of local people by encouraging their participation in the festival. Nature lovers, tourists and visitors from various parts of Maharashtra and neighboring states attend the festival. Nearly 250 visitors comprising of housewives, school and college students, doctors, engineers, journalists, photographers, social workers, nature researchers and teachers attended the festival in 2008. A cricket tournament 'Kasav Chashak' was also arranged at Velas and Kolthare. This encouraged the participation and involvement of the youth of the area.

Under a proposal that was accepted by the Maharashtra Forest Department for carrying out activities for the conservation of marine turtles and vultures in the area, two district level training programmes were conducted by our organization for the staff of the Ratnagiri and Raigad District Forest Departments. The training programme included lectures, slide shows and film screenings.

Mangroves

In 2008, we carried out activities under the 'Mangrove Project'. Activities included arranging of slide shows, lectures, film screenings and photography and poster exhibitions in the coastal villages of Dabhol creek, to increase awareness about mangroves. Students from 25 Zilla Parishad (District Council) primary schools and 5 high schools participated in the events. We also organised a painting contest for school students at Dabhol and Kolthare in Ratnagiri district. A village meeting to create awareness about mangrove ecology was also organised at Anjarla.

Awards

In the year 2007-2008, our organisation was honored with the following awards:

- 'Prani-Paxi Sahayak Puraskar' presented to Bhau Katdare by Radhabai Hardikar of the Pranijat Mangal Sanstha in October, 2007.
- 'Jiwhala Gaurav Puraskar' presented to Bhau Katdare by the Jiwhala Super Market in December, 2007.
- 'Vasundhara Mitra' presented to Bhau Katdare at the Vasundhara International Film Festival at Pune in March, 2008.

Plans for the year 2008 – 2009

Our current plans are:

- To establish Vulture Conservation Centres
- To extend activities of the marine turtle conservation along the entire coastline of Maharashtra and specific protection activities to a minimum of 50 locations.
- To carry out *in situ* conservation of marine turtles at 10 locations.
- To establish a 'Student Nature Club' to increase awareness and encourage participation of school students in the area.
- To carry out awareness programmes for mangrove conservation.

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Conservation of sea turtles in Kachchh on the western coast of Gujarat

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In continuation of the earlier note (see Meena *et al.*, 2007) on sea turtle hatcheries in Kachchh, Gujarat (Figure 1), the efforts made thereafter have been geared primarily towards increasing public awareness for the conservation of sea turtles (Figure 2). A flag hoisting ceremony conducted on Republic Day, 26th January 2007 at Mandvi-Kutch attracted considerable attention. The theme of the ceremony was that sea turtles are our guests and they should be welcome on Mandvi coast. Such awareness programmes have encouraged support to forest officials by the local community in conservation activities, for example, conserving turtle eggs along the coast. The Hon'ble Chief Minister Shri Narendra Modi inaugurated the newly constructed sea turtle hatchery at Mandvi on 20th September 2007 and applauded the conservation efforts that were being carried out. Such encouragement has boosted the enthusiasm of the local community and field foresters to conserve this endangered species.

Figure 1: Sea turtle hatchery in Kachchh, Gujarat.

Figure 2: Sea turtle conservation public awareness campaigns.

The details of the collection of turtle eggs and hatching during the year 2007-08 is given below in Table 1.

Table 1: Egg collection and hatching success at Mandvi
Note: Survival depends on handling by the field staff during collection.

Collection of eggs		**Survival of hatchlings**		**Survival percentage**
Date	**Number**	**Date**	**Number**	
15.07.07	130	05.09.07	89	68
28.07.07	129	17.09.07	78	60
29.07.07	97	25.09.07	74	76
30.07.07	99	29.09.07	79	80
07.08.07	104	08.10.07	83	80
18.08.07	125	08.10.07	105	84
23.08.07	120	23.10.07	88	73
24.08.07	103	19.10.07	82	80
06.09.07	99	31.10.07	76	77
10.09.07	56	03.11.07	47	84
12.09.07	89	06.11.07	73	82
18.09.07	103	16.11.07	87	84
16.03.08	113	-	-	-
Total	**1369**			

The results above clearly show that the hatching success is good. In order to minimise mortality during collection, an *in situ* removable hatchery will be set up this year on site.

Our experience has shown that the coordinated efforts of the local community and field staff can ensure the conservation and survival of sea turtles.

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Meena, R.L., J.V. Vyas & R.S. Jadeja. 2007. Sea turtle hatcheries in Kachchh, Gujarat. *Indian Ocean Turtle Newsletter* 5: 19-20.

Proceedings of the workshop on the conservation of sea turtles and mangroves at Kumta, Karnataka

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The Canara Green Academy works on the conservation of sea turtles along the coastline of the Arabian Sea in the Uttar Kannada district of Karnataka, India. The Academy conducted a workshop on conservation of sea turtles and mangroves on 25 January, 2008.

The workshop was inaugurated by Sri G. Satish, IFS, Conservator of Forests, Kanara Circle, Sirsi who gave a formal inaugural speech. Three persons from different local communities were honored in recognition of the assistance they have provided to the Academy. The morning session began with a presentation made by N.D. Bhat, President of Canara Green Academy. He described the work that was carried out by the Academy on sea turtle conservation in Uttar Kannada. The presentation also included information about awareness programmes conducted, collection of turtle eggs from poachers and the establishment of turtle breeding centers at different locations.

Dr. V. N. Nayak from Department of Marine Biology at Karwar made a presentation on the distribution of and threats to sea turtles in Uttar Kannada and eco-friendly sea erosion control methods. Dr. Vijayakumaran of CMFRI, Mangalore made a presentation on climate change and sea turtle conservation. Sudarshan Rodriguez from ATREE, Bangalore spoke about the effectiveness of coastal legislation, in particular consequences that the proposed notification on coastal management (Coastal Management Zone Notification) would have on sea turtle conservation. An effort by Theeram (a non-government organization in Kerala) for the conservation of sea turtles was presented by Abdul Latif from the Institute of Wood Science and Technology, Bangalore. Dr. Gourish Padukone, a veterinary doctor from Bhatkal, Karnataka made a presentation on diseases that afflict marine turtles.

The afternoon session focused on the conservation of mangroves. Dr. Subhash Chandran made a presentation on the distribution of mangroves in Karnataka and the threats they currently face. This was followed by a presentation made by Vijayamohan Raj, IFS, Deputy Conservator of Forests, Sirsi Division, Sirsi on 'Opportunity of Eco-tourism' in mangroves. Mahesh Shiroor, IFS, Deputy Conservator of Forests, Karwar Division spoke about the steps the Karnataka Forest Department has undertaken for the conservation of mangroves. M.R. Hegde, President of Snehakunja, Honavar made a presentation on the role of community in conservation of mangroves.

In addition to these presentations, Dr. Kakti from the Regional Centre, CMFRI at Karwar also elaborated on the necessity for mangrove conservation. Sri Ananth Kumar Hegde, Hon'ble Member of Parliament from Uttar Kannada presented his views on conservation of biodiversity. Manojkumar, IFS, Deputy Conservator of Forests (WL), Dandeli concluded the proceedings of the workshop by briefly summarizing the main points elaborated by the presentations made. The workshop ended with the vote of thanks by R.G. Bhat, ACF, Honavar.

Green turtle nesting at Gris Gris beach in Mauritius

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The oceanic islands of Mauritius and its outer islands are ideal nesting sites for green sea turtles. In the 1800s, the Dutch reported great numbers of turtle nesting in Mauritius, but due to exploitation by man and the loss of favourable habitats for nesting, very few turtles exist in the waters around Mauritius today. There may have been occasional nesting of turtles in the past few years, but these events have not been documented. Nesting of the green sea turtle *Chelonia mydas* was first reported in 1977 (Thompson, 1981) at La Cambuse, in southeast Mauritius. Legal protection offered to marine turtles dates back to the enforcement of the Fisheries Act of 1980 and more recently to the Fisheries & Marine Resource Act of 1998.

After 31 years, successful egg-laying and hatching of a green sea turtle was observed in Mauritius at Gris Gris, a sublime and beautiful beach in the south of the country (Figure 1). A nesting turtle was observed laying eggs on the beach late at night on 31 October 2007 by a villager who informed the National Coast guard, the Fisheries Protection Service (FPS) and the Albion Fisheries Research Centre (AFRC) which is the technical arm of the Ministry of Agro-Industry and Fisheries. Subsequently, the nesting site was protected and on 10 January 2008, 4 hatchlings were collected from the site. The movement of most of the hatchlings (79) went unnoticed due to heavy rains, and out of the four hatchlings, 3 were released at sea and one is being reared at the Albion Fisheries Research Centre. On 25th January 2008, the nest was excavated; the clutch had 113 eggs of which 83 hatched egg shells, 21 unhatched eggs and 10 decayed eggs were noted.

This event is exceptional for Mauritius whose coastline is bearing the brunt of rapid development and brings hope that green sea turtles will visit the calm, pristine beaches in future for nesting.

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Thompson, R.K. 1981. Nesting of the green sea turtle, *Chelonia mydas* (Linnaeus) 1758, in Mauritius. Revue Agricole et Sucriere de l'Ile Maurice 60:125-130.

Figure 1: Gris Gris beach in Mauritius

Research Summaries

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Harewood, A. & Horrocks J. 2008. Impacts of coastal development on hawksbill hatchling survival and swimming success during the initial offshore migration. *Biological Conservation* 141: 394-401.

Coastal development and associated light pollution adjacent to turtle nesting beaches is, or is becoming, an issue in many nations. Since orientation in sea turtle hatchlings was first investigated in the 1960s, the issues surrounding their dispersal and the impact of artificial light have received considerable attention (see review by Lohmann *et al.,* 1997). While much of the attention has been on orientation and light distraction of hatchlings as they crawl down the beach, fewer studies have addressed offshore orientation in response to coastal light pollution. In a recent study, Harewood and Horrocks investigated the swimming behaviour of hatchlings in the first 20 minutes of swimming in relation to various natural and artificial light horizons. Their investigation found that while overall predation rates were low (6.9%) hatchlings released from lighted beaches spent longer swimming within 100 meters of the beach and artificial light and moonlight both played an important role in the ability of hatchlings to escape the inshore waters. Essentially their study, and other similar studies, highlighted that even though hatchlings get to the water, light pollution on adjacent beaches can trap the hatchlings in the shallow inshore waters where predators are often more abundant and trapping them in the inshore zone can cause premature use of yolk stores. The findings of Harewood and Horrock's study are important because they demonstrate that solving light pollution issues is more complex than keeping specific nesting beaches dark and coastal planners should consider creating darkened zones along the coastal fringe or around islands. Further implications of the research could involve predicting and managing shifts in turtle nesting zones with altered beach profiles or locations as a result of climate change impacts.

Fish *et al.* 2008. Construction setback regulations and sea level rise: mitigating sea turtle nesting beach loss. *Ocean and Coastal Management* 51: 330-341.

A critical aspect of turtle management will involve both (1) understanding the impacts of climate change on nesting beaches and (2) how turtles will respond/adapt to changed conditions. Within these two broad areas exists a whole suite of geomorphological, ecological and social factors, and the links between them, that can be explored. Fish and colleagues approached the issue from the point of view of; beach space, turtle nest site use and development restrictions in Barbados. They used standard survey techniques and GIS software to create elevation models for main nesting beaches. They then used IPCC (International Panel on Climate Change) sea level rise predictions to assess the likely impact "loss of beach" under different predictions and different development setback regulations. Setback regulations differ under various local and state legislation but generally dictate how close to the coastline development can occur. The results of the study demonstrated that with changes to sea level patterns the effective development setbacks of 10

and 30m are no longer sufficient to protect the foreshore dune systems, which would have implications for the flora and fauna that depend on them. Fish and colleagues have used an inter-disciplinary approach combining survey techniques with turtle biology to predict the impacts that climate change or development regulations may have on beach/dune systems. This is a powerful tool in the design of mitigation and management and a technique that could easily have broader application in marine turtle nesting beach management.

Hays, G.C. (ed). 2008. Sea turtles: physiological, molecular and behavioural ecology and conservation biology. *Journal of Experimental Marine Biology and Ecology, Special Issue* 356: 1-144

This is a rich period for syntheses and reviews on various aspects related to sea turtle biology and conservation. In the past five years, there have been several scientific books published specifically on sea turtle topics such as: the biology of sea turtles (Lutz *et al.,* 2003), loggerhead turtles (Bolten & Witherington, 2003), ridley turtles (Plotkin, 2007), turtles in the Indian subcontinent (Shanker & Choudhury, 2006), and turtles in the Northeast Atlantic (Lopez-Jurado & Loza, 2007). In addition, there have been special issues of scientific journals dedicated to sea turtles, such as the Kemp's ridley (*Chelonian Conservation and Biology* Vol. 4:4), the leatherback turtle (*Chelonian Conservation and Biology* Vol. 6:1), and marine turtles as flagships (*Maritime Studies* Volumes 3:2 and 4:1). The breadth and depth of topics covered by these various publications is impressive, but there is always room for more reviews and syntheses. Recently, the *Journal of Experimental Marine Biology and Ecology* (or *JEMBE*) published a special double issue (Vol. 356:1-2) on sea turtles, edited by Graeme C. Hays. This compilation of papers is dedicated to subjects related to physiological, molecular and behavioral ecology and conservation biology of marine turtles. The special issue contains six review papers and five original research papers, four of the latter dedicated to in-water behavior as revealed by dataloggers or satellite tags. The other research paper describes a possible link between climate change, specifically increasing ocean temperatures, and reduced reproductive output of Pacific loggerheads. All the research papers are of interest in their own right, but here we focus on the review papers.

Considering the review papers, the subjects are: metabolic rates, genetics, predation of adults, IUCN Red List categories, leatherback research in Gabon and Suriname/French Guiana, and navigation. All should be of interest to anyone who works with sea turtles, although perhaps the paper on leatherback conservation work in two large rookeries in the Atlantic is targeted to a subset of sea turtle workers. Nevertheless, this paper does highlight the challenges associated with establishing standardised protocols for monitoring basic life history parameters and behavior on turtles that tend to nest densely and/or over wide areas. The other reviews are much more general and applicable to all locations, and are also illuminating.

The review on metabolic rates is the first review of its kind, and likely reflects the increasing sophistication of recent studies on physiological processes of sea turtles. This paper describes various metabolic rate values estimated for different species and life stages, and what methods were used. However, the real meat of the review comes in the second half, when values are linked to actual turtle behaviors, such as migration or thermoregulation. There is also an extended section on leatherback thermoregulation, which is fascinatingly complex if still not completely understood phenomenon. The review on genetics or molecular ecology is not the first of its kind (two general reviews were recently published by Bowen & Karl, 2007 and Avise, 2007). However, it does provide a different focus, with emphasis on molecular methods and how they have evolved over time.

There is also an extended discussion on multiple paternity in sea turtles, describing both data and theory related to this interesting reproductive behavior that is apparently common in most species of sea turtle. The review on IUCN Red List categories for sea turtles is somewhat technical but highly readable and provides eye-opening information on the difficulties of classifying

widely distributed taxa (such as sea turtle species) under one category of extinction risk. It should make everyone think carefully about what it means to state that sea turtles are endangered. The review on navigation is an update to earlier reviews (e.g. Lohmann *et al.*, 1999), and it is replete with new information and data. The research on sea turtle navigation is fascinating, especially in the past decade when turtles have been actively manipulated, for example by attaching magnets to their bodies or displacing individuals far away from their original position, and monitored. It may come as a surprise to some that although turtles can use a magnetic field to orient themselves, they also use other cues to navigate.

Overall, the review papers in the special issue of *JEMBE* are rich in information and insight. Ideally, one should read them all, but even if you have time to read only one, go ahead - pick one out and read it. You should find it quite insightful and stimulating, and you will be sure to learn a lot.

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NGO Profile

The Rushikulya Sea Turtle Protection Committee

The Rushikulya River merges into the Bay of Bengal near Ganjam town in Southern Orissa. On the northern side of the river, a wide stretch of beach is the favored nesting site of olive ridley turtles. Every year from November to the end of January, mating takes place in the coastal waters. Hundreds of thousands of female turtles then visit the beach *en masse* to lay their eggs from February to early April. After a 45 - 50 day incubation, hatchlings creep out of the sandy nests and crawl back into the sea. When wildlife biologist Dr. Bivash Pandav visited the village of Purunabandha in 1994, he was appalled to see turtle eggs being destroyed by crows, dogs and jackals. The lack of awareness about the olive ridley turtles among the villagers prompted him to set up the Rushikulya Sea Turtle Protection Committee (RSTPC) with the assistance of the local youth in 1998. The RSTPC was officially registered in 2003. Right from its inception, volunteers including Rabindra Nath Sahu, Damburu Behera, M. Shankar Rao, Mohan Behera, Gouranga Behera, Ganapati Sahu and others became wholeheartedly involved in spreading awareness among the village folk about the ridleys, thus ensuring the involvement of the community in conservation efforts.

Today, the Rushikulya Sea Turtle Protection Committee is a 37 member strong organization with youth belonging to the 3 villages of Purunabandha, Gokharkuda and Kantiagada. The RSTPC initially started with activities like beach cleaning, beach profiling, monitoring arrival of turtles for nesting and keeping fishermen and predators away from the beach during the nesting and hatching seasons. Over time however, the activities of the RSTPC grew in leaps and bounds to include awareness programmes for the local communities and school children.

That the olive ridley turtle, an endangered species, is fast dwindling in number, is a matter of grave concern for wildlife enthusiasts. Of the 3 mass nesting sites along the Orissa coast – Gahirmatha, Rushikulya and Devi River mouth, only Gahirmatha is legally protected. The Rushikulya rookery, its unprotected status notwithstanding, has come to acquire a special significance due to the consistent arrival of thousands of olive ridleys for their 'arribada' over the years. In this context, the members of the RSTPC have begun to monitor the nesting population and also assist in the release of hatchlings during mass hatching. They have also encouraged visitors, research scholars from various universities, locals and especially children to participate in the collection and release of disoriented hatchlings as a part of their awareness programmes. At Rushikulya beach, hatchlings often get disoriented due to artificial lighting. The RSTPC members have therefore involved themselves in collecting the hatchlings in buckets and then releasing them in the ocean. Recently, a net has been placed along the beach to enable easy collection of hatchlings.

By putting up stalls and creating sculptures of turtles, the RSTPC has made its presence felt at Gopalpur Beach festival in recent years. The V.J. Sheth Memorial Sea Turtle Interpretation Centre has been set up by the RSTPC (courtesy the Eastern Shipping Corporation, Mumbai), which aims to increase public awareness about sea turtles and conservation programmes. Due to the efforts of the organization, the sale and consumption of sea turtle eggs in the 3 coastal villages of Purunabandha, Gokharkuda and Kantiagada have been put to an end. For the locals, the turtle is sacrosanct as an incarnation of Lord Vishnu.

Current activities of the RSTPC are undertaken in collaboration with other organisations and agencies which include the Forest Department, Orissa, Dakshin Foundation, Bangalore, Wildlife Institute of India, Greenpeace, World Turtle Trust, Wildlife Society of Orissa, People for Animals and the Wildlife Trust of India. Members of RSTPC who have been trained by wildlife experts serve as research assistants, working in collaboration with scientists such as Dr. Bivash Pandav, Dr. Basudev Tripathi, Dr. Kartik Shanker Dr. Chandrasekhar Kar and researchers such as Suresh Kumar and Divya Karnad.

The current projects of the RSTPC include data collection from the tagging of turtles, recapture studies, distribution of the mating congregation, satellite transmitter ranging studies and monitoring hatchling mortality rates. Education and awareness materials are also provided by the RSTPC to local school children and organisations in the form of CDs, journals, documentaries and pictures. The Rushikulya Sea Turtle Protection Committee boasts of a well equipped library with colourful books on wildlife in general and marine creatures in particular.

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Figure 1: RSTPC volunteers collecting hatchlings from a mass hatching event. These hatchlings get misoriented by artificial lighting and move towards meadows on the landward side.

Project profile

The Carpentaria Ghost Net Programme

"The Ghost Net Project is for people from (Indigenous) communities all around the Gulf of Carpentaria to find ways to work together to get rid of marine debris in their sea country."
Djawa Yunupingu, Dhimurru Land Management Aboriginal Corporation

In the decade preceding 2004, north Australian Indigenous Sea Rangers noted that an increasing number of turtles were becoming entangled in ghost nets (derelict fishing nets) where they forage for food and/or nest. This was of particular concern to them as this region is home to 6 species of marine turtle all of which are culturally & economically significant as well as of ecological importance. The project got underway in 2005 with funding from the Australian government. Its primary goals are:

- To clean up the coastline in northern Australia of existing nets to stop them re-entering the ocean,
- To collect useful information about these nets to assist negotiations by various parties in stopping fishing nets becoming Ghost Nets,
- To build the resilience of Indigenous Rangers to continue work on ghost nets ranger work beyond the life of this project, and
- To rescue any animals found trapped.

In the past three years the programme has involved 18 ranger groups working along the coastline from the Torres Straits to northern Arnhem Land, a distance of thousands of kilometres. The rangers have measured, identified, catalogued & removed over 4,000 net samples ranging in size from a mere scrap to a monster net weighing over 6 tonnes. Most importantly, they have rescued hundreds of turtles. In February this year, on a 42 kilometre nesting beach near Weipa, there were 63 turtles entangled in the nets. Fortunately there were two Napranum Shire rangers, Peter and Angie, living on the beach who managed to rescue 50% of them. Half of these turtles were olive ridleys.

For more information, see www.ghostnets.com.au

Contributor: Riki Gunn

President's Report, 28th International Sea Turtle Symposium Loreto, Baja California Sur, Mexico 19-26 January 2008[1]

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The Symposium

"*We are at the Awana Kijal Golf, Beach & Spa Resort, a nine-story monster of a building, which conveniently has an ice cold conference room with no windows, just like all the others in thousands of hotels around the world. Kill the lights and fire up the PowerPoint. You could be in New Jersey. There has got to be another way . . .*"
(Mark Spalding of The Ocean Foundation)

Indeed there is. There was absolutely no mistaking the 2008 ISTS in Loreto, Mexico for New Jersey or Cabo San Lucas for that matter. From top to bottom, most everything about this year's ISTS was rethought, reinvented or renewed in some way…except for the sea turtle biology and conservation theme itself and the special camaraderie of our members.

There's no way to take on such a task without a committed, clever and hard working team, and we had just that in Journey Mexico, our program committee and our tireless corps of local and international volunteers.

The community of Loreto in its entirety rolled up its sleeves, opened their homes, painted the town for us (literally) and demonstrated the best of the combination of hospitality and charm Loreto is known for. Add to that strong support from our sponsors—some familiar and some brand new. Plus the spirit of adventure of our members: you who attended, walked in the rain, tested the organic tequila and helped turn Loreto into Turtle Town for a week. We thank each of you for helping to make this meeting—more than a meeting, a gathering, really—the great success that it was. The organizing team has jokingly discussed writing a book called *Extreme Adventure Conferencing*. I think we are on to something.

Elena Finkbeiner merits her own section in the President's Report for her tireless work on every aspect of the 28th ISTS in the years preceding it, on site and afterwards. Looking back on past ISTS reports it's clear that this unofficial "vice president" role is nothing new and always critical to the meeting's success.

General Program: Well over 400 abstracts were submitted, which provided the Program Chairs (Jeffrey Seminoff and Raquel Briseno Duenas), the Program Coordinator (DuBose Griffin) and their 20-member Program Committee with a tremendous amount of work. Over 390 abstracts were accepted for presentation. Symposium proceedings will be forthcoming in the very near future, printed and distributed thanks to Sheryan Epperly and the NOAA Southeast Fisheries Science Center. For the first time a presentation archive is accessible online at: http://www.seaturtle.org/ists/archive.php.

On the 19th – 22nd January, several regional meetings took place including: the 10th Annual Grupo Tortuguero Meeting, the 15th Latin American (RETOMALA) meeting, the Wider Caribbean Sea Turtle Network (WIDECAST) meeting, the Indian Ocean South East Asia (IOSEA) meeting, and the Africa meeting. Many thanks to Egle Flores for coordinating the university location and all of the regional meetings and workshops.

[1] The publication of this article was delayed as IOTN 8 was a special issue dedicated to the Dhamra Port debate.

The Symposium kicked off on 22nd January with a special Sea Turtles of the Californias Mini-symposium. The California session was co-hosted by Hoyt Peckham and Jeffrey Seminoff and included talks by Scott Benson, Peter Dutton, Antonio Loza, Teresa Ruiz-Vallejo, Elizabeth Gonzalez Payan, Dana Wingfield, Alexander Gaos, Jonathan Mabry, Volker Koch, Agnese Mancini, Julio Solis Hernandez, David Maldonaldo Diaz, Hoyt Peckham and Georgita Ruiz.

The regular program followed until the morning of the 25th. Concurrent sessions were not implemented this year, and instead three minute "Speed Sessions" were added to the program. This addition proved successful and will be integrated into future symposia programs. In total there were 98 oral and 293 poster presentations, covering the following sessions: Anatomy, Physiology, and Health; Behavior and Movement; Conservation, Management and Policy; Public Education and Advocacy; Fisheries; Population Biology and Modeling; Genetics; Foraging and Developmental Areas; Nesting Status and Biology; and Social, Economic and Cultural Studies.

A series of Workshops were held concurrently with talks during the regular program. Workshops were held at the local university and were conducted in a variety of formats including open discussion, organised lecture and hands-on training. Workshops explored the following topics: Conservation Tourism, Epibionts, Hawksbill Genetics, Sea Turtles as Sentinels of Marine Ecological Health, Fisheries Bycatch, Bayesian Statistics and Fresh Water Turtles.

Posters this year were located outdoors in the Plaza abutting the first mission in the Californias. Posters were displayed all at once for the entirety of the symposium with two "Question & Answer" periods of 1.25 h each. The timely preparation and the smooth running of the program, as well as the efficient arrangement of the posters would not have been possible without the dedication of the Program Officers, the Program Committee, the Session Chairs and the Poster Session Chair, Ana Barragon.

On 26th January, the Annual Meeting of the SSC/IUCN Marine Turtle Specialist Group convened.

Native Oceans Council: "Native Oceans" was chosen as the theme of the 28th annual ISTS in recognition that sea turtle conservation is not only a modern effort, but a continuation of an ancient tradition that indigenous peoples the world over have practiced for centuries. Moreover, it is known that indigenous conservation is critical to international conservation efforts as indigenous peoples are most often living in the closest contact with the natural environment, have the strongest cultural ties to other species and have a direct need to coexist with other animals such as sea turtles. This theme was reflected not only through the participation of indigenous groups, but also through the scientific presentations as authors responded to the call to re-think conservation efforts, paying special attention to "shifting baseline" concepts, and placing the current findings and status of marine systems in a socio-historical context. Onsite at ISTS this year, we had the participation of over 50 indigenous people representing 15 indigenous nations from Australia, Mexico, Nicaragua, Palau, Panama, and Venezuela. The Seri, as the official hosts of the ISTS, welcomed the community with four days of Leatherback Ceremony and at the Welcome Social.

During the ISTS meeting the Native Oceans Council met on several occasions, including in a public session in the Loreto town plaza, in which the Seri formally welcomed each indigenous nation and participants exchanged music, art, ritual, stories, questions and information about their respective communities and projects. Additionally, the Seri and the Australian Traditional Owners began a formal knowledge exchange which will continue throughout the year; they will have their second face-to-face meeting in Australia in the fall of 2008.

Through our work at the ISTS, the commitment of the Native Oceans participants was strengthened as new project ideas were born and solutions to pre-existing problems were discovered. Additionally, the exchange of age-old traditional knowledge and 21st century conservation strategies with the international sea turtle conservation community

brought new inspiration and deepened the commitment to their work; it also raised new questions and concerns that warrant investigation. From all sides, the desire to grow the NativeOceans project has never been stronger. Native Oceans is an ongoing project of Ocean Revolution and will play a role at the ISTS 2009 in Brisbane.

LIVBLUE Challenge, Towards a more sustainable Sea Turtle Society: Solar energy, organic coffee, organic tequila, organic cotton t-shirts, waste reduction (use of personal mugs and bottles), recycling, compostable flatware and cutlery, LIVBLUE Challenge awards, local food, local revenue sharing, regranting of ISTS laptops and projectors, local university coffee services, Seri-made journey bags, bicycles, walking, Loretano volunteers, sustainable seafood and cold showers were among the elements of our efforts to make the ISTS more sustainable, both in terms of its physical footprint and its social benefit. The mere fact that we spread our many hundreds of thousands of dollars over dozens of hotels, restaurants and local merchants meant that the positive message of sea turtle conservation spread by the ISTS was both heard and felt by a new audience. Some of these changes are with us to stay.

The Archie Carr Best Student Paper Award: Eight awards were given to the best student oral and poster presentations and runners-up, in the categories of Biology and Conservation. In total, the Judging Committee examined 130 contributions. The award certificates were accompanied by an honorarium, including a subscription to Chelonian Conservation and Biology. Anders Rhodin, through the Chelonian Research Foundation, co-sponsors students' awards along with the ISTS. In total, $3000 was distributed to the winners. I would like to extend an extra-special thank-you to the co-chairs of the Judges, Lisa Campbell, Matthew Godfrey, and Jeanette Wyneken, as well as the 20-member Judging Committee for their important work. A formal reporting of the best authors and their presentation titles will appear in the Symposium Proceedings.

Travel Grants: A great number of conference participants were assisted by the Travel Grant program to attend the 28th Annual Symposium on Sea Turtle Conservation and Biology. A total of 196 grantees from fifty-seven countries benefited from ISTS travel assistance to this year's symposium. In total, we allocated $50,500 in the form of checks and cash to recipients (See Table 1 for details). In addition to financial awards, we offered beds to 200 grantees, which cost another $16,000 for a total of $66,500 spent on travel grants. The organisations providing funding for this year's symposium included the Western Pacific Fisheries Management Council, NMFS Office of Protected Species, US Fish and Wildlife Service, Walt Disney Animal Kingdom, Florida Power and Light, Sirtrack Ltd, Project Global, The David and Lucile Packard Foundation, Robert Allen Law, Sandler Family Supporting Foundation, Defenders of Wildlife, Norcross, Majorie Sale Arundel Fund for the Environment, Telonics and Wildlife Computers. There were also numerous smaller donors, too many to be mentioned here. Ed Drane, Barbara Schroeder, Sheryan Epperly, Earl Possardt, Sandy MacPherson, Irene Kinan, Wallace J. Nichols, Brad Nahill and Elena Finkbeiner provided invaluable assistance in securing funds and in fund-raising efforts. The delicate job of allocating travel grants was handled by the Travel Committee Chair, Hoyt Peckham, and the Regional Travel Chairs including Angela Formia and Manjula Tiwari (Africa), Nicolas Pilcher (Asia/Pacific), Karen Eckert (Caribbean), Aliki Panagopoulou (Europe), Alejandro Fallabrino (Latin America), Kartik Shanker (India/South Asia) and Bryan Wallace (USA/Canada).

Media: We had a strong showing in the press thanks primarily to the efforts of Splash Communication, The Santa Barbara Independent, and Tree Media Group. We had many press outputs this year, including stories in local media outlets, international media outlets and many on-site interviews. (See links at my blog wallacejnichols.org in the Print-Web section).

Local Participation: Local participation was especially robust at the 28th symposium due to the concurrent meeting of the local grassroots organisation, Grupo Tortuguero. Several hundred Grupo Tortuguero participants stuck around to

participate in the symposium. In addition, community members were encouraged to participate in several symposium activities free of charge, including the Seri Indian leatherback ceremony and the Native Oceans Council meeting.

Due to the setup of poster presentations in the mission plaza, community members were able to view research and meet the poster authors. Several computers and projectors were purchased for use at the symposium, and these were donated to local non-profit organisations at the conclusion of the symposium.

Vendors: Vendor chair Celene Nahill deserves special thanks for organizing a large number of vendors in a very successful effort. Vendor logistics were particularly difficult this year due to weather anomalies so a big thanks to Celene for her tireless effort and to all the vendors for being flexible and enthusiastic!

Entertainment: Loreto was never lacking in entertainment thanks to the wonderful coordination of the Live and Silent Auctions by Jen Homcy, Alec Hutchinson and Roderic Mast. The Opening Social held in the mission plaza offered an amazing array of local food, while the Farewell Banquet held at the Inn at Loreto Bay provided a delectable spread of regional specialties. Organic tequila provided by 4 Copas and long nights of dancing completed the quintessential Mexican experience.

ISTS Business

Nominations and Elections: The 2008 election marked the first time the International Sea Turtle Society completed elections online. In total, 298 votes were logged, which was approximately twice the number of people in attendance at the plenary session in Loreto. This was also approximately 100 votes more than we have logged during any previous election. Each of the nominees was evaluated for open seats: two on the Board of Directors (BoD) and two on the Nominating Committee (NC). The following candidates were elected: Didiher Chacon and Scott Eckert for the BoD positions, and Annette Broderick and Jeanette Wyneken for the NC.

In addition, the NC recommended that the BoD approve the following slate for the Executive Committee: President-Elect Kartik Shanker, Treasurer Edwin Drane, and Secretary Manjula Tiwari. The BoD accepted this slate and it was approved unanimously by the general membership during the Plenary. I would like to congratulate the new members and also thank the departing BoD members Hedelvy Guada and Donna Shaver, the past president Michael Coyne, and the NC members Scott Eckert and Alberto Abreu. For complete details visit the ISTS website (http://www.seaturtle.org/ists/nominations.php).

Resolutions: There were no resolutions at the 2008 ISTS Business Meeting.

On behalf of the ISTS Board of Directors and Organizing Committee I would like to thank the entire Ocean Conservancy staff for their support of the ISTS. An extraordinary amount of time is required of the president to organise the Annual Sea Turtle Symposium and the support of his/her organisation is critical to the success of the meeting. I especially recognise the vision and leadership of Ocean Conservancy this year as the ISTS undertook an unusually complex event.

30th Annual Symposium on Sea Turtle Biology and Conservation
Goa, India
27th – 29th April, 2010

Kartik Shanker

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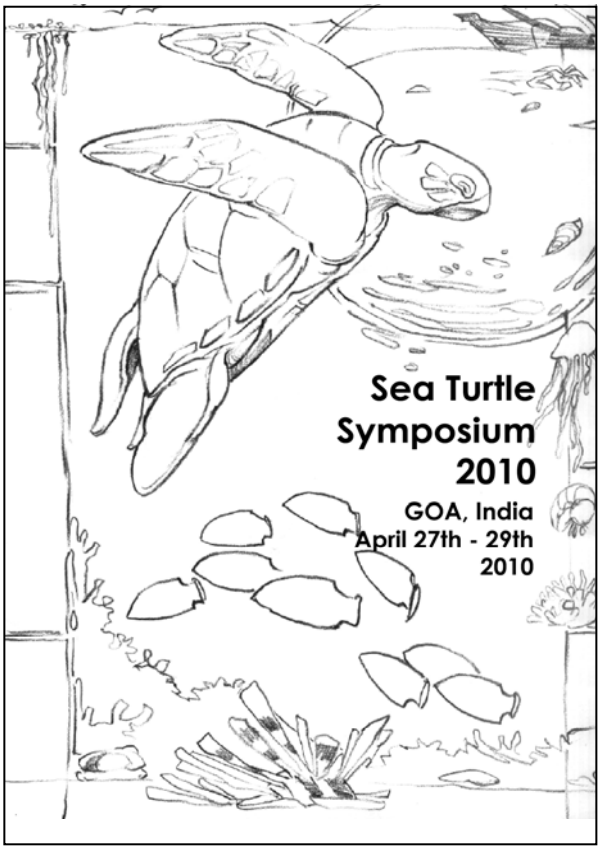
The Annual Symposium on Sea Turtle Biology & Conservation, conducted by the International Sea Turtle Society (ISTS), will be coming to south Asia for the first time in 30 years. Different countries, cultures, landscapes and coasts comprise this region, but sea turtles respect few of these boundaries. Olive ridley turtles nesting in Orissa feed in the Gulf of Mannar shared by India and Sri Lanka. Green turtles share nesting beaches on the west coast in India and Pakistan. Turtles feed and nest together in the Sunderbans shared by India and Bangladesh. A female green turtle tagged in Karachi, Pakistan visits the Gulf of Kachchh on the west coast of India.



In keeping with their philosophy, the 30th symposium seeks to break down barriers and boundaries between people, their countries and cultures in order to achieve marine conservation through its most global flagship, the sea turtle. This event will strengthen collaboration, promote networking and conservation of marine ecosystems and sea turtles in South Asia. The symposium will bring together scientists, experts, practioners, researchers and students from around the world to promote the wider global movement under the umbrella of sea turtle conservation.

Theme: *The world of turtles*

Sea turtles inhabit the land and the sea. They connect the shallow nearshore waters to the open sea, cold temperate to warm tropical waters. They migrate across ocean basins. And through several thousands of years, they have connected us ecologically and culturally to the sea. The thirtieth annual symposium on sea turtle biology and conservation will seek to explore these connections and focus on the world they live in. The world of coral reefs, seagrass meadows, open seas and sandy beaches. The world of people, living and working on the coast or at sea; of fishing cultures and livelihoods. All connected by sea turtles and by us.

When and where?

Symposium dates: *27th – 29th April, 2010*
Venue: *The Kala Academy, Panaji, Goa, India*

Goa, home to many cultures from around the world, is the ideal location to host the Sea Turtle Symposium, bringing together a diversity of people, cultures and ideas.

Symposium agenda

Pre-symposium events begin on the 24th of April, 2010. Regional meetings, workshops and the MTSG meeting will be held from 24th – 26th April, 2010.

The main days of the symposium (27th – 29th April) will comprise of oral, speed and poster presentations by participants. In addition, special sessions and events will be held, including a *Fisheries Mela*, an exhibition of fishing craft and gear used within the region.

Travel and accommodation

International flights ply to all major Indian cities on a regular basis. Mumbai, one of the primary gateways to India is situated north of Goa, and is the closest port of entry. Trains, buses and taxis frequently ply between Mumbai and Panaji, the capital of Goa and the location of the symposium. Goa also has an international airport located 30km from Panaji.

Traveling within India is easy on the pocket. Low budget airlines and an extensive road and rail network connect all corners of the country. We recommend applying for visas to India well in advance. A dedicated team will help with details of the procedure to apply for visas and documents needed. This information will be up on our website soon. You can also find useful visa and travel related information at www.visatoindia.com and www.tourism.gov.in.

Goa offers a wide range of accommodation options, from star-rated beach resorts to student dormitories and home stays.

Online symposium information

Information about the 2010 Sea Turtle Symposium will be available online at iconferences.seaturtle.org. For more information about the South Asia symposium, log on to india.seaturtle.org.

By registering as a member of the International Sea Turtle Society (at seaturtle.org), you will be sent regular updates of symposium related information including deadlines for submission of abstracts and applications for travel grants, symposium schedule and other related activities and announcements.

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