

# INDIAN OCEAN TURTLE NEWSLETTER

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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.

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### **Reference styles in list:**

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## EDITORIAL

### The real impact of the 2004 tsunami

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Though nearly two years have passed since the 2004 tsunami, there is still little clarity on its long term environmental impacts. This is largely because attention has been focused largely on its direct physical impacts. What areas were inundated? What beaches were washed away? What reefs were damaged or uplifted? How has the topography changed? Assessments of the impacts on wildlife and their habitats largely focused on similar parameters (Kaul and Menon, 2006a, 2006b). Similarly, reports on marine turtles have looked at impacts on nesting beaches (Hamann *et al.*, 2006). These reports definitely provide a useful compilation of the short term impacts of the tsunami itself. Studies of sociological impacts have also documented fairly thoroughly loss of lives and livelihoods, damage to houses and boats, etc.

Subsequent to studies of physical impacts, many commentators have spoken of the tsunami of assistance, the tsunami of non-government organizations, the tsunami of developmental aid and organizations, and not the least, the tsunami of sweeping change in a community unable to resist it. Which of these will have the most impact on the coast and its environment? I do not pretend to have the answer.

With regard to the environment, for example, there has already been a great deal of discussion about the issue of bioshields. The Tamil Nadu Forest Department has initiated large scale planting of *Casuarina* along the coast. This has been undertaken without a careful analysis of whether such plantations are indeed beneficial in the long term for coastal sustainability. Elsewhere, *Casuarina* plantations on the coast have been cited as a major cause of beach habitat loss (Pandav, 2005). Thus, what beaches were not washed away by the tsunami may well be washed away by responses to it. Coastal features such as sand dunes

which may be critical to coastal integrity have been given scant attention, and used for reconstruction or plantations.

Similarly, fish stocks may not have been directly affected by the wave, but may be affected by rehabilitation. Post-tsunami, many boats have been replaced and the proportion of mechanized and motorized boats may actually increase. Given that the fisheries and marine habitats were already detrimentally affected by bottom trawling, these actions may further aggravate both ecological and livelihood issues on the coast.

The rehabilitation of affected communities offers another case. Fishing communities have long occupied the shore, and have often resisted attempts to use the land for development. In the name of safety and coastal vulnerability, housing projects for rehabilitation have been planned at a distance from the sea. There are fears in the community that by moving them away from the sea, the land is actually being opened up for 'invasion' by the government and private sector.

There is another issue here. Environmental and socio-ecological issues on the coast clearly preceded the tsunami. It is against this background trend that one must assess the impacts of the tsunami and responses to it. Many tsunami reports did, for example, find that violation of the Coastal Regulation Zone (CRZ) notification norms resulted in loss of both property and life (Kaul and Menon, 2000a, b). However, this seems far from adequate in addressing the fact that the impacts of the tsunami reach far beyond the wave itself, both in environmental and sociological terms.

Following their relief assistance, the United Nations system developed a Post-Tsunami Recovery Framework to aid the Government of

India in its post-tsunami rehabilitation and reconstruction efforts (UN, 2006). Since environment sustainability is a critical component of the framework, the UNDP launched the 'Post-Tsunami Environment Initiative' (<http://www.ptei-india.org>), a project jointly executed by the Nature Conservation Foundation (NCF), Mysore, the Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore and the Citizen, consumer and civic Action Group (CAG), Chennai. This complements other projects in the region by local and international agencies. This project aims to understand coastal vulnerability and resilience in the face of such natural disasters within the Indian context, establish participatory monitoring systems, critically analyse developmental policy, and develop management models for key sites along the coast.

As mentioned, coastal issues have to be viewed in the context of processes that preceded the tsunami. In July 2004, the Ministry of Environment and Forests (MoEF) set up an Expert Committee headed by Professor M.S. Swaminathan to carry out a comprehensive review of the CRZ Notification. Its mission was to enable the MoEF to base its coastal regulations on strong scientific principles and to devise regulations that would meet the urgent need for coastal conservation and development / livelihood needs. The Committee submitted its report in February 2005, a month after the tsunami (MOEF, 2005). Clearly, there are deficiencies with the CRZ and with the overall design and implementation of coastal area

management in the country. While the general principles outlined by the Swaminathan Committee are commendable, the actual planning and implementation of an enhanced management regime go far beyond the report (Sridhar *et al.* 2006).

Sridhar *et al.* (2006) outline the steps that need to be taken in order to implement an improved coastal management regime. Principally, they recommend the need for a clear timeframe for implementation, a state-wise review of the CRZ notification including current violations and loopholes, major public consultations/workshops to facilitate a participatory process for developing changes to legislation, and incorporation of hazard and risk management in the overall coastal management mechanism with adequate flexibility to account for specific cases.

Future research and detailed review based on primary and secondary biological, legal and sociological information is required to guide policy changes, accompanied with monitoring along the coast. Detailed geo-referenced maps need to be prepared for the entire coast to facilitate a GIS-based approach to coastal management. This should be in the public domain and in user-friendly formats along with all other CRZ related information to encourage widespread regulation of the law. Coastal conservation and management, both within and outside the context of the tsunami, needs to take into account a full range of issues if it is to be successful in the long term.

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## Marine turtle status and distribution in the Andaman and Nicobar islands after the 2004 M 9 quake and tsunami

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### Introduction

The pre tsunami status and distribution of the leatherback turtle (*Dermochelys coriacea*), hawksbill turtle (*Eretmochelys imbricata*), green turtle (*Chelonia mydas*) and olive ridley (*Lepidochelys olivacea*) in the Andaman and Nicobar islands has been documented over the last two decades (see Bhaskar, 1979, 1993; Sivasundar & Devi Prasad, 1996), Andrews (2000), Andrews & Shanker, 2002 and Andrews *et al.* (2006). Bhaskar (1993) and Andrews *et al.* (2006) have also discussed the historical records of marine turtles in these islands. Bhaskar & Andrews (1993) formulated an action plan for the four species in the islands.

The leatherback and hawksbill populations nesting in the Andamans and Nicobars are the largest for India and most important for the Northern Indian Ocean region. The leatherback nesting population in the Nicobar islands was one of the few colonies that exceeds over 1000 nesting individuals in the Indo-Pacific, and hence of global significance (Andrews & Shanker, 2002). Andrews & Tripathy (2004) and Andrews *et al.* (2006) recorded 30 nesting sites in North Andamans, 27 in Middle Andamans, 21 in South Andamans, six sites in Little Andaman Island and 26 sites in the Nicobar group.

The 26<sup>th</sup> December 2004 M 9 quake caused the subsidence of the Nicobar Islands and areas around South Andaman Island, besides an upheaval, by an average of 1 m, on Little Andaman Island, northwestern South Andaman, entire Middle and North Andaman Islands including Landfall Island. The subsidence of the

Nicobars and South Andaman Island by an average of 1 m caused high tides reaching inland and flooding of coastal lowlands. In the Nicobars, being just north of Sumatra, coastal habitats in all the 23 islands have been affected, and beaches and coastal habitats have been swept away. The impacts and ecological changes in both island groups have been discussed in detail by Andrews (2005), Sankaran (2005), Andrews & Vaughan (2005) and by Jayaraj & Andrews (2005).

### Methods

Observations and assessments of the coastal habitats and beaches, and reef flats were conducted by ground surveys. Areas and islands were assessed with a local inboard, dugout canoe (Andaman dunggi). Reef flats were observed onshore and offshore. In Great Nicobar Island, surveys were conducted by ground and helicopter surveys and in central Nicobars by boat and on foot. Some areas of South Andaman Island were surveyed over land. Beaches were surveyed on foot during the mornings and evenings to count turtle nests and tracks; tracks/crawls were categorized as fresh, (crawls with visible flipper marks), and old (those with either only the nest excavation mound and or faint tracks visible). The data recorded were counts made on a single walk (on occasion to and fro) along a beach to ascertain the presence or absence of turtle nesting activity, and species visiting the beach. Off shore sightings were also recorded and surveys were conducted during January-April 2005 and during January-March 2006. Two field camps were started during the second week of October 2005, for monitoring nesting, at Cuthbert Bay, north east of Middle Andaman Islands and at Rutland Island, on Jahaji beach, on the southern side of the island.

## Results

### *Middle and North Andaman Islands*

During January–April 2005 and January– March 2006, the beaches on South Reef, Interview, North Reef, Snark, Point, Paget, Reef, West, Landfall and East islands were surveyed (Fig: 1). There was very little changes to the beaches on these islands but due to the upheaval of reef flats, many nesting beach areas have become inaccessible for turtles. The reef flats on the northern, western and the southern sides of South Reef Island, extend for roughly about 2 km<sup>2</sup>. Six nests of hawksbills were recorded during the 2005 survey on this island. The beaches on the south west coast and north eastern side of Interview Island have become inaccessible for turtles to nest due to reef flat upheaval. The beach on the south west coast of Interview Island used to be one of the most favoured nesting beaches for green turtles (Bhaskar, 1984; Andrews *et al.*, 2001). The sea grass bed on the north of Interview Island at Brasse Point had been swept away; however regeneration of small tufts, 3-4 cm high, was observed. Over 10 green turtles and three hawksbills of different size classes were sighted in this bay (Andrews & Vaughan, 2005).

Beaches on North Reef Island, on the north western and eastern sides, have minimal changes; however the beach on the south eastern side has built up. Due to exposed reefs to an extent of 4.5 km<sup>2</sup>, marine turtles do not have access to these beaches for nesting and this was evident as no tracks or nests were found on these beaches. Two plastrons of green turtles were found on the west coast and no evidence was available to conclude the cause of death. However, 22 sightings of green turtles around the island, off shore and among deeper reefs, were recorded (Andrews, 2005). During the 2006 survey, a few under nourished green turtles were seen trapped in tide pools and lagoons created due to reef upheaval. The reef flats on the western, southern and eastern side of Latouche Island were also exposed and eight green turtles and three hawksbills were sighted off North reef Island.

The exposed reef flats along the northeastern side, the northern, eastern and the southern sides of West Island, is estimated to be 4.5 km<sup>2</sup>. Reefs, 2- 4 m deep, were observed on the eastern and southern sides of Snark and six green turtle nests and nine tracks and four hawksbill nests were found on Snark Island. Beaches on the southern sides of Snark Island have changed very little. Due to the upheaval of reef flats, turtles do not have access to the beaches on the eastern and western sides of Point, Paget, West, Landfall and East Islands (Fig. 1). On Flat Island, no signs of nesting were observed during the 2005 season; however during the 2006 survey, two green turtle nests and one hawksbill nest were recorded. Opposite Flat Island on the main island of Middle Andaman, a beach and spit cover the coast where rocky shoal and coral reef abut the passage between Flat Island and the main island. A single hawksbill nest was recorded on this beach in 2006.

Very minor changes have occurred to beaches along the western and eastern coasts of Middle Andaman Island (Fig. 2). Most beaches were swept away only partially and high tides reached the forest though subsequently in 2006 new beach deposits were observed. These beaches include, from the south western side, Foul Bay, Tanmuguta, Yadita and Robert Bay; and on the eastern coast, Cape Vestal, Paikat Bay, Woteng and Cuthbert Bay Turtle Sanctuary. Green turtles and olive ridleys were nesting up to April 2005 at Paikat Bay, Woteng and at Cuthbert Bay.

ANET monitored turtle nesting trends during early January 2005 at Cuthbert Bay Turtle Sanctuary. After the tsunami, six green turtles were encountered and two nested. Of the 94 olive ridleys encountered, 65 nested and the one leatherback encountered also nested. Nesting on this beach ceased by 27<sup>th</sup> April 2005. During the following nesting season, October 2005 to March 2006, 118 olive ridleys were encountered and 109 nested, 16 green turtles were encountered of which eight nested and two leatherbacks were encountered, but did not nest.

### *Ritchie's Archipelago and South Andamans*

During March 2005, eight green turtle and three olive ridley nests were counted on Middle Button Island. Eleven green turtle and six olive ridley nests were observed on Inglis/East Island. During the 2006

survey, 21 green turtles and 3 leatherbacks were found to have nested on North Button Island. Along the South Andamans, the Madhuban Beach east of South Andaman, along Mount Harriet National Park, north of Port Blair, was surveyed during 2005 (Fig. 3). Old and fresh tracks and nests of two species of turtles, green turtles and three olive ridleys, were recorded. However, these nests could not have survived as they were being flooded during high tides.

During the 2005 survey, it was observed that the beaches on east and west Twin islands, Rutland, North and South Cinque and South Brother Islands were partially swept away and the high tide reached the forest line. The sand bar along the south western side of North Cinque was swept away by the tsunami and currently a sand bar has formed and the beach has built up. Very minor impacts on coastal forests were observed on all these islands, including Boat, Hobday, Redskin and Tarmugli Islands. There was no evidence of nesting on these islands after the tsunami in 2005.

During the last monitoring programme by ANET, between October 2005 and March 2006, the team on Rutland Island encountered 44 green turtles, of which 22 nested, and 19 olive ridleys, of which 17 nested; of the 10 hawksbills encountered, three nested and of the 12 leatherbacks that emerged on the beach, 10 nested. During November 2005, one leatherback and two green turtle nests were recorded on North Cinque Island and there was no evidence of nesting on South Cinque. During the same month, three hawksbill nests and one green turtle nest were observed on east Twin Island and nine hawksbills and four green turtle nests on west Twin Island. A second survey of the same islands conducted during March 2006 resulted in six green turtle, three hawksbill and one olive ridley nest on east Twin Island, and three green turtle, six hawksbill and four olive ridley nests on west Twin Island.

#### *Little Andaman Island*

The three major sea turtle nesting beaches surveyed during March 2005, West Bay, South Bay on the west coast and Butler Bay on the

eastern coast, were all affected. These beaches were washed away partially and submerged during the high tide. There was no evidence of turtle nesting on these beaches in 2005, but observations and indications during the 2006 survey suggest significant visitation and nesting by turtles, especially leatherbacks and that these beaches are reforming. Two other large beaches were formed after the tsunami, one starting at the northern side off the mouth of Jackson Creek measuring a length of 5 km (Fig. 4). Turtle tracks and nests of three species, green turtles (four nests), olive ridleys (three nests) and leatherback (two nests), were recorded from this beach. Another 2 km long beach had formed, situated 4 km south of Jackson Creek and four nests of green turtles and two olive ridley nests were found on this beach.

During the 2006 survey, an older member of the Onge community remarked that they (the Onge from Dugong creek) had gone turtle hunting along the shore and off the mouth of Dugong Creek, after many of their women told them that they wanted to eat turtle meat. The men went out along the shore and to sea returning with a few green turtles and the women were disappointed as the turtles were lean and did not have any fat and meat. They then realized that the sea grass beds were damaged and the sea turtles did not have much to eat. The women then told the men that despite their hunger to taste sea turtles, it would be better to wait and allow the sea grass to grow so that sea turtles could feed themselves before they became food for the Onge; since then they have not hunted.

#### *Great Nicobar and areas in the central Nicobar group of islands*

The Nicobar Islands were surveyed during January – February 2005. The entire coastal area and habitats have been completely affected and destroyed impacting all coastal flora and fauna and affecting some of the mega species. In the Galathea area and the entire South Bay, the tsunami wave had gone inland to a distance of almost 1.5 km. This had destroyed all the beaches, mangroves and the entire coastal habitat of South Bay, including the areas around the light house at 51 km. Debris, consist of fallen trees, plastics, timber and other flotsam from the sea drift on to the land at each high tide. The high tide line reached the hill slope upto the forests; existing coastal trees, mangrove species and other

coastal flora are drying up. During the month of April 2006, it was reported that the coasts along western Great Nicobar Island had regressed further due to continued wave action and erosion (R. Sankaran *pers. comm*). The same effect was observed on the west coast of Little Nicobar Island and islands in the central group and on Car Nicobar Island.

The most affected sea turtle nesting beaches along the east coast of Great Nicobar are the Galathea beach and the beach stretch from 47-51 km (along the north – south road), and along the west coast are areas near the Alexandria and Dagmar Rivers, Rekoret and Renhong. Beaches along Little Nicobar west coast and Katchal Islands and those areas on Great Nicobar Island were prime sea turtle nesting beaches and these have been washed away. In Great Nicobar Island in South Bay, two beaches are forming, one at 43 km and at the other at 45.5 km (along the north – south road). Hawksbills and olive ridleys were observed nesting at these two beaches. However these nests were destroyed as these beaches flood at high tide. Beach deposition had taken place toward the end of 2005 from Indira Point, the southern most tip of Great Nicobar Island, to Inhingloi on the west coast. The beaches on the west coast and North eastern coast of Little Nicobar Islands were impacted; however leatherback nesting was observed up to March 2005 along the west coast at Muhincohn beach (M. Chandi, *pers. comm.*).

### Recommendations

Currently no major management or conservation effort, apart from continuing sea turtle monitoring and awareness programs, is required for the Andaman and Nicobar Islands. The sea turtle beaches that have been affected will reform after a few monsoons and other new beaches will form in the next two to three years; this will require monitoring as marine turtles will find new nesting beaches. However, the next five years will be crucial and intensive surveys and monitoring will be required to quantify nesting trends, populations and the nesting beaches forming along the islands.

Coastal planting and restoration programmes are currently not required and mangroves and *Casuarina* plantations may not protect from tsunamis. There is also no need for creating wind breakers, as there are other native littoral species (other than *Casuarina*) that can be used to reduce erosion along coast. Natural regeneration and succession of species of flora are underway that could be affected by undue human intervention. In the absence of adequate information on natural resilience and succession, human interference should be minimised. There is also an urgent need for surveys of sea grass beds to quantify impacts and extent. The growth and regeneration of sea grass beds have implications for sea turtles that rely on them for food. Further, a GIS based analysis is required to derive the actual extent of beach and reef flat loss, besides remapping the entire Andaman and Nicobar Islands and its topography.

There is an urgent need to review fisheries practices around the islands and fishing zones. Fishing should be restricted to only 5 km offshore from the high tide line of all islands. During the past several years, surveys by ANET have observed and recorded drowning and entanglement in gill nets and drifting ghost nets, leading to death of sea turtles in significant numbers. Awareness generation and enforcement of no fishing zones in vulnerable regions are required. A plan of action needs to be urgently formulated and immediately implemented for removal of feral and domestic dogs from the Andaman and the Nicobar Islands, as they predate on eggs of turtles and also on nesting turtles.

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Figure: 1. North Andaman Islands

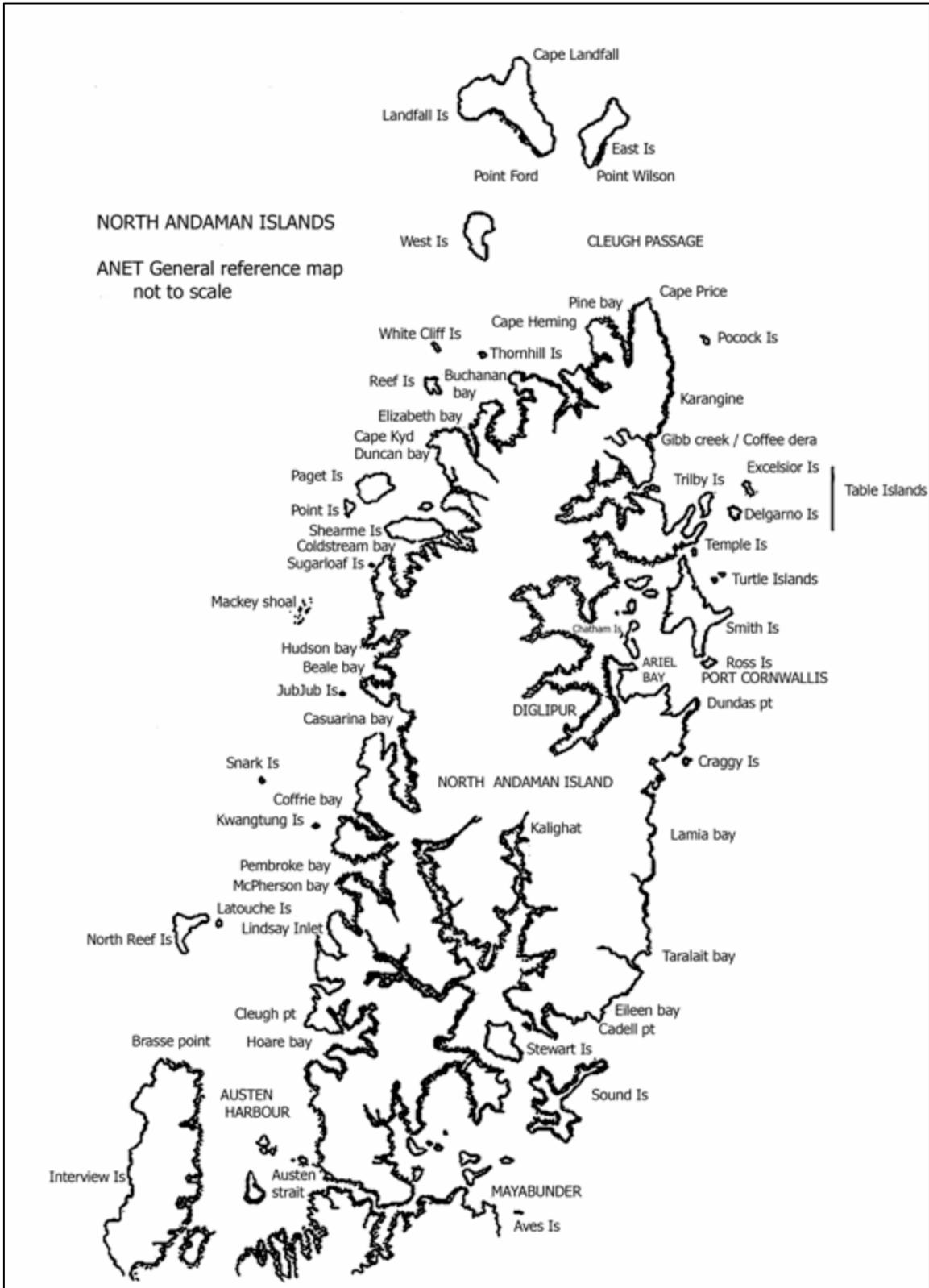


Figure: 2. Middle Andaman Islands

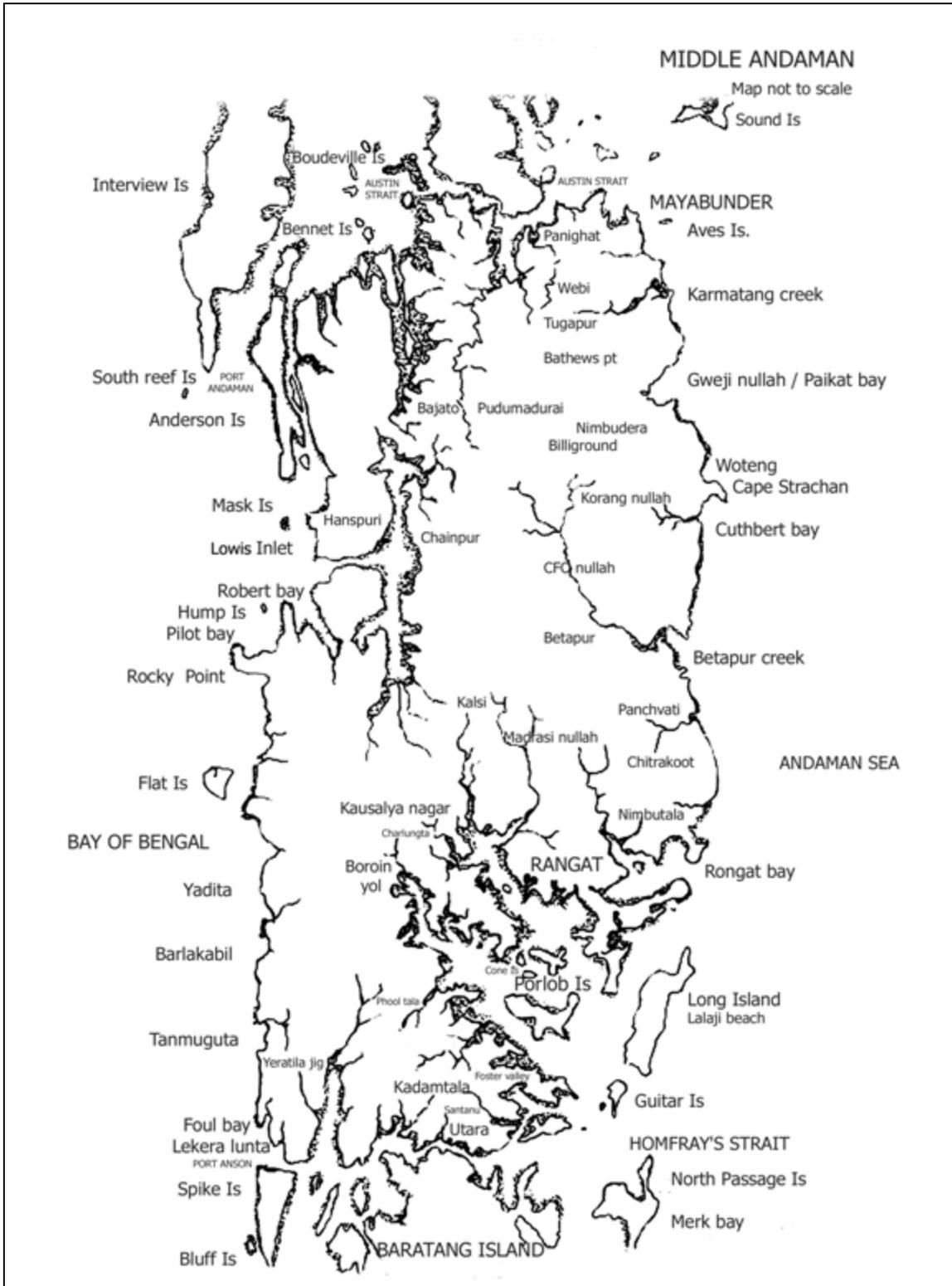


Figure: 3. South Andaman Islands and Ritchie's Archipelago

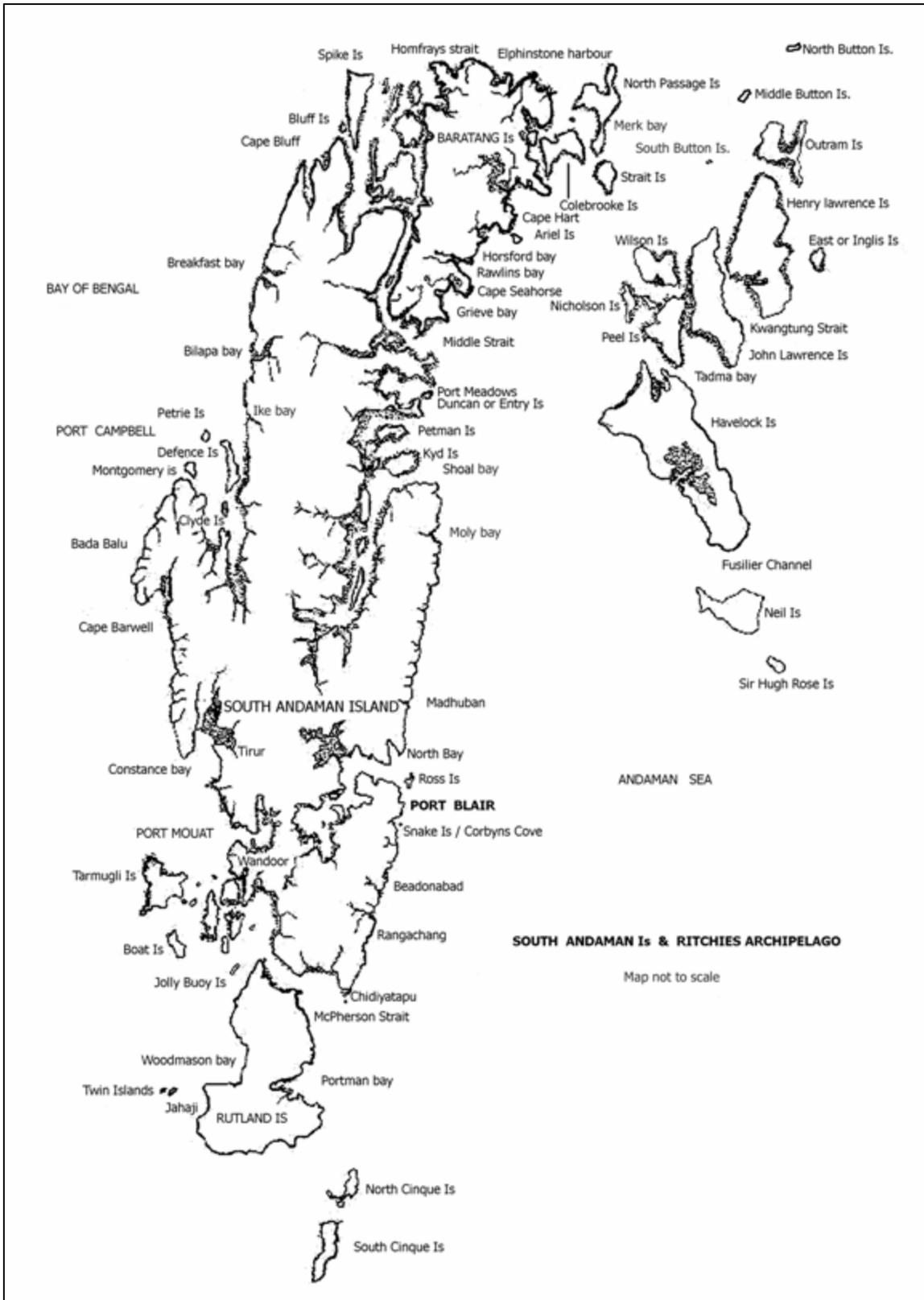
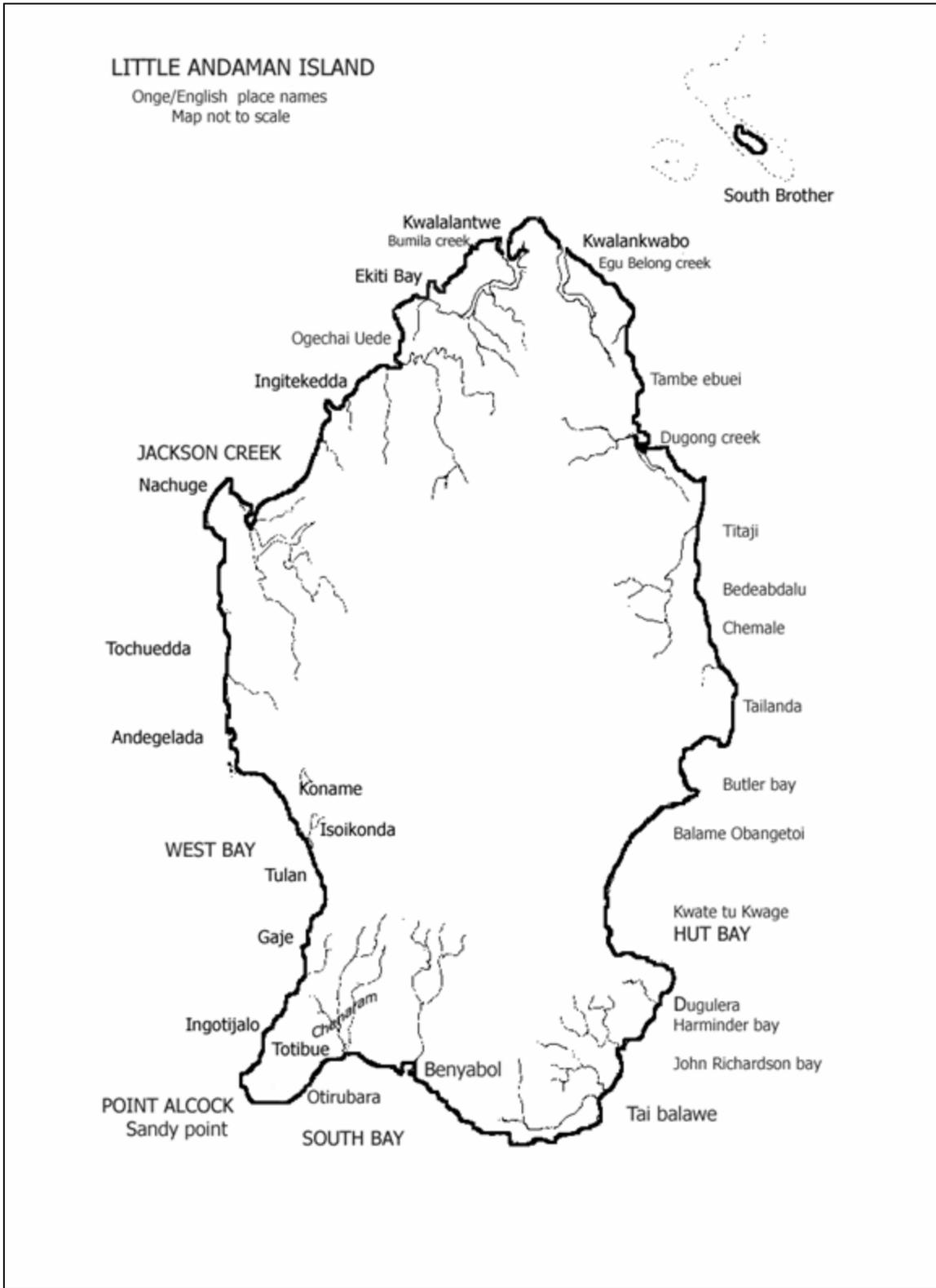


Figure: 4. Little Andaman Island



## Potential for developing marine turtle tourism as an alternative to hunting in Bali, Indonesia

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### Introduction

Despite the policies and laws that prohibit the trade of marine turtles in the Indo-Pacific, Limpus (1988) estimates 100,000 green turtles (*Chelonia mydas*) are harvested from within this region each year to supply local and overseas markets. Up to 25,000 of these turtles have been reported to be transported to Bali every year, and are subsequently slaughtered for their meat, eggs, shells and leather (Marinos, 1997; Animal Conservation for Life, 2001), making Bali one of the largest traders in marine turtle products. Eighty percent of these turtles are consumed in Indonesia, whereas the remainder are exported to Japan, Singapore, Hong Kong, China and Taiwan (Animal Conservation for Life, 2001). Consequently, the adult green turtle population has declined to a state where juvenile turtles are becoming more commonly caught (Animal Conservation for Life, 2001). World Wildlife Fund for Nature (WWF) Wallacea warns "marine turtles will disappear from Indonesian waters within 30 years if the current scale of turtle exploitation continues" (P. Mustika, *pers. comm.*).

In Bali, where the majority of people practise Hinduism, green turtles have been sacrificed for religious purposes for centuries (Putra, 1996). However, Hindus have become accustomed to eating green turtles as a common food source and a means to survive, rather than strictly for religious Hindu ceremonies (Putra, 1996). Humane Society International (HSI) argues that the turtle trade has become more lucrative in direct response to increased poverty in Indonesia and the necessity for a stronger economy that is competitive with developed countries (M. Kennedy, *pers. comm.*).

Despite efforts by Indonesian government authorities to control the illegal turtle trade,

harvesting of marine turtles continues to prosper. Therefore, it has become apparent that research into alternative methods of conserving turtles is needed. A representative of WWF Wallacea, Puta Liza Mustika says "the turtle trade industry is not sustainable, and therefore has no long-term benefits for Indonesia, however, turtle tourism would be a sustainable industry depending on adequate management".

### Turtle-based tourism as a conservation tool

In recent years, the role of tourism as an alternative to turtle hunting has been well documented (Vieitas *et al.*, 1999; Godfrey & Drif, 2001). The Marine Turtle Specialist Group (MTSG) has also endorsed ecotourism, as a solution on a global scale, for the problems facing conservation programs, particularly in developing countries (IUCN, 1995). Many developing countries, such as Sabah Marine Park in Malaysia; Fiji in the South Pacific; Tortugero National Park and Rio Oro in Costa Rica; Bahia Magdalena in Mexico; and Zakynthos in Greece are at various stages of developing turtle-based tourism as a conservation strategy. The concept of utilising tourism as a tool for achieving management objectives relating to conservation has become more acceptable, with increasing interests in augmenting tourist visitation to nesting beaches in the form of turtle-based ecotourism (Godfrey & Drif, 2001).

The main attraction of developing turtle-based tourism in less developed countries is that it can substitute the wages lost from hunting and contribute to the conservation of marine turtles at the same time (Vieitas *et al.*, 1999). Other benefits include the development of community amenities; community capacity building; education and awareness of the environment; maintenance of cultural identity; potential opportunities for

generating revenue for the local economy; and conserving marine turtles and the natural environment (Nichols *et al.*, 2000). One of the most successful marine turtle conservation programs is Projecto TAMAR-IBAMA in Brazil, where turtle-based ecotourism has been used as an alternative to hunting marine turtles (Godfrey & Drif, 2001). The success of the program is based on local participation of the community in educational programs, tour-guide training, festivals, and the employment of former egg poachers to patrol the beaches and protect the nests (Marcovaldi & Marcovaldi, 1999). In this way, turtle-based ecotourism has become an extremely useful tool in providing an alternative income for hunters and the community, whilst conserving marine turtles for future generations.

### **Potential for developing marine turtle tourism in Bali**

Within the tourism industry worldwide, ecotourism is one of the fastest growing sectors (Newsome *et al.*, 2002). In the Asia-Pacific region, this is certainly the trend (Lindberg, 1997). In particular, the growth of the tourism industry in Bali has been expeditious, and has increased from 30,000 visitors in 1969 to more than half a million in 1990 (McCarthy, 2001). In Bali, the infrastructure for expanding the scope of ecotourism already exists, however the potential for developing turtle-based ecotourism for the purpose of substituting the turtle harvesting industry has not yet been recognised. This makes Bali an ideal candidate for investigating the use of tourism as an alternative to turtle hunting, and could be used as a benchmark

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for other developing countries facing similar issues.

A study conducted by Waayers (2001) explored the potential for developing turtle-based tourism in Bali, by establishing whether tourists are actually interested in participating in turtle-based tourism, and whether the tour operators based in Bali are willing to integrate turtle tours into their business. The results indicated that the majority of tourists were willing to participate in tourism based on marine turtles in Bali, whilst operators were open to including marine turtle tourism as a specific tour. However, several tour operators were reluctant to undertake turtle tours because of their lack of knowledge of marine turtle biology and behaviour and the unreliability of sightings of nesting female turtles.

### **Conclusion**

Although these results are encouraging for the development of marine turtle tourism in Bali, there are a number of factors that need to be addressed concurrently. These factors include creating economic incentives for local people and former hunters to become involved in the development of marine turtle tourism, educating and training operators and former hunters in best practice operations, and preparing and implementing a marketing strategy which promotes marine turtle tourism as a conservation tool in Bali. In order to implement these strategies, a management framework that integrates scientific research and traditional methods of conservation such as the Banjar system needs to be developed.

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## **A brief update of sea turtle conservation activities of the Vasant J. Sheth Memorial Foundation**

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### **The Vasant J. Sheth Sea Turtle Interpretation Centre, Rushikulya**

The Vasant J. Sheth Memorial Foundation supported and developed the Vasant J. Sheth Sea Turtle Interpretation Centre at the Rushikulya beach in Orissa which is one of the largest nesting sites of the olive ridley sea turtles in the world. The centre is the only one of its kind situated close to an important nesting site of sea turtles in the country.

On an average the Rushikulya beach attracts over a hundred thousand olive ridley turtles every year for mass nesting - a phenomenon known as the 'arribada' (a Spanish word meaning 'arrival'). In 2006, I witnessed the arribada that took place in February. The Foundation has funded the Rushikulya Sea Turtle Protection Committee, an organisation of locals dedicated to sea turtle conservation and protection at Rushikulya for the

past decade. The interpretation centre has displays and information panels on sea turtle conservation, breeding, hatching and environmental threats to their survival. The arribada attracts several visitors to Rushikulya and we believe that the interpretation centre will perform an important role in educating them and spreading the message of marine turtle conservation.

### **Sea Turtle conservation in Maharashtra**

The Vasant J. Sheth Memorial Foundation has funded Sahyadri Nisarga Mitra, an organisation working for the conservation of marine turtles on the Konkan coast of Maharashtra. Although Maharashtra does not witness arribadas like Orissa, sporadic nesting takes place almost throughout the coast. In the year 2006 more than 50 turtle nests were protected in hatcheries erected at the selected beaches and more than 300 hatchlings have been released into the sea.

## The 27th International Symposium on Sea Turtle Biology and Conservation

**Michael S. Coyne**

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The “27th Annual Symposium on Sea Turtle Biology and Conservation” is now only five months away. The 2007 symposium will be held at the Kingston Plantation on the Atlantic Ocean in Myrtle Beach, South Carolina, USA. This is a great facility allowing us to place all symposium events within close proximity to one another. We anticipate having a variety of local and regional tours and activities available for meeting attendees. Listed below is specific information regarding the 27th Annual Symposium on Sea Turtle Biology and Conservation. Additional details will be posted on the symposium website <<http://www.seaturtle.org/symposium/>> and published in the next issue of the MTN.

**Symposium dates:** Thursday 22 February - Wednesday 28 February 2007. Main dates: 25-27 February.

**Venue:** Myrtle Beach, South Carolina, USA <<http://www.kingstonplantation.com/>>.

**Room prices:** Standard Room for up to four persons will be \$109 per night. The price includes a full breakfast buffet (for all persons in the room) and a nightly “happy hour”. Room prices will be the same for three days before and after the Symposium dates if you wish to stay and vacation in the area.

**Transportation:** The hotel is approximately 13 miles (20 km) from the Myrtle Beach International Airport. The airport is similar in size to the Savannah airport, for those who attended the 25th Symposium. Specific instructions and approximate costs for local transportation and alternative routes will appear on the Symposium website.

**Meeting agenda:** There will be a special session on sea turtle projects in the Carolinas that will emphasize the work and commitment of volunteers

and other participants in the monitoring of sea turtles in North & South Carolina. In addition, Brendan Godley is organizing a special plenary session entitled “Tracking of Marine Vertebrates for Conservation”. This special session is sponsored by Inter-Research (IR - <http://www.int-res.com>) and will form part of a high profile series of symposia <<http://www.ir-symposia.com>>. The Program Committee is finalizing the remaining sessions with appropriate specialist chairpersons in each subject area. If you have suggestions for Workshops, Special Sessions or other side-events please contact the Symposium Program Chairs: Matthew Godfrey ([mgodfrey@seaturtle.org](mailto:mgodfrey@seaturtle.org)) and Lisa Campbell ([lisa.m.campbell@duke.edu](mailto:lisa.m.campbell@duke.edu)).

**Regional meetings:** The usual regional meetings (e.g., African, IOSEA, Latin American, Mediterranean, WIDECAST) are scheduled for the dates 22-24 February. MTSG meeting: 28 February.

**Registration:** All those who will attend the Symposium must register. Registration will be on-line through the Symposium website. It is highly preferred that registration fees are paid on-line using a credit card. If you must mail your payments, please consult the Symposium website for specific instructions.

**Abstracts:** All abstracts must be submitted on-line through the Symposium website and must follow the Instructions for Abstract Submission posted there. The deadline for submission is 15 October 2006. You will be asked to register and pay before submitting your abstract. All abstracts will be reviewed by a Program Committee made up of panels of subject specialists, to ensure the best possible content for the Symposium. All abstracts should be of highest quality. Due to increasing numbers of abstracts submitted, some abstracts may be rejected by the Program Committee.

**New this year:** Each lead author may submit only one abstract to be considered for an oral presentation and one abstract to be considered for a poster presentation. Lead authors are assumed to be the presenting author, unless otherwise indicated in the submission. In past years, multiple abstracts have been submitted by individuals on behalf of others, due to restricted internet access. This practice can continue; when submitting abstracts, you will be asked to clearly identify the lead author.

Please note that accepted abstracts will appear in the Symposium's Proceedings available at the meeting. There will be no opportunity to submit a revised version of the abstract for the proceedings.

**Travel grants:** The deadline for travel grant applications is 15 October 2006. Instructions for Travel Grants can be found on the Symposium website. Hopefully, we will be able to cover a good part of travel expenses for those in need. Of course, matching funds will be essential; so, please, start looking from now for potential sponsors.

**Hotel reservations:** Reservations for hotel rooms will be made through The Zenith Group <<http://www.thezenithgrp.com/>> as soon as the necessary reservation forms are ready. Deadline for hotel room reservations is 22 January 2007. After that time room reservations will be subject to availability and room rates will not be guaranteed.

**Visas:** If you will require a visa to enter the USA to attend the 27th Annual Sea Turtle Symposium, you should immediately begin the application process. A number of people were not able to attend last year's symposium due to delays associated with obtaining visas. Information regarding visas will be included on the Symposium's website.

**Auction items:** Please start thinking about items that you might donate for the live auction and silent auction. The live auction and silent auction represent a major avenue for raising funds to help support travel grants for the Annual Sea Turtle Symposium, so please try to contribute an auction item. Information forms for auction items will be available from the Symposium's website - you can fill out the form prior to arriving at the symposium.

**Vendors:** We are hoping to locate the poster sessions, coffee breaks, and vendors within close proximity to one another, as well as the oral presentation room. Information for vendors who would like to reserve space at the 27th Annual Sea Turtle Symposium will be available on the Symposium's website.

**Coffee-break sponsors:** Please consider becoming a coffee break sponsor. You will be able to sign up to be a sponsor during on-line registration on the Symposium's website.

**The 26<sup>th</sup> International Symposium on Sea Turtle Biology and Conservation -  
(Island of Crete, Greece, 3-8 April 2006)  
President's Report on the Symposium and ISTS Business**

**Dimitris Margaritoulis**

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**The Symposium**

*Overview*

The 26<sup>th</sup> Annual Symposium on Sea Turtle Biology and Conservation was admittedly a pronounced success. For the first time in its long history it was hosted in the Mediterranean, on the island of Crete, and this gave many under-represented countries an opportunity to take part in this globally important event. With about 700 participants from 78 countries it fulfilled its motto: 'Diverse Cultures, One Purpose'.

The Island of Crete, at the crossroads of Africa, Asia and Europe proved an excellent selection. Also the meeting's venue, Capsis Beach Hotel at the village of Aghia Pelaghia, located 20 km from Heraklion International airport, provided adequate facilities, agreeable surroundings, and relatively good prices.

Submitted abstracts surpassed the five hundred mark (500!), breaking records of all previous Symposia, loading the Program Officers (Dr. Brendan Godley and Dr. Kartik Shanker) and the 35-member Program Committee with a tremendous amount of work, which culminated in the 376-page Book of Abstracts, printed on time for on-site distribution to participants. Here I should also mention the scholastic work of the four compilers (Mick Frick, Aliko Panagopoulou, Alan Rees and Kris Williams).

On 3<sup>rd</sup> and 4<sup>th</sup> April, regional meetings took place: the 5<sup>th</sup> Mediterranean Reunion, the Latin American (RETOMALA) meeting, and the WIDECAST (Wider Caribbean Sea Turtle Network) meeting. On 4<sup>th</sup> April two more regional meetings were

added: the IOSEA (Indian Ocean and South-East Asia) meeting and the Africa meeting. Details of these meetings can be obtained by contacting the regional coordinators, although I believe that individual reports will appear either in the MTN or in regional listservers.

The official opening took place in the morning of 5<sup>th</sup> April, with welcome speeches from the Symposium President, the Prefect of Heraklion Mr. D. Sarris, and the Coordinator of UNEP's Mediterranean Action Plan (MAP) Mr. Paul Mifsud. The invited speaker of the Symposium was Dr. Wolf Michael Iwand of TUI, the largest tour operator in the world, who talked about the interaction of sea turtles and the tourist industry and how these two could best benefit from each other; it was a really challenging talk, with examples from various parts of the world.

In a special two and a half hour session in memory of Peter Lutz, named 'Sea Turtle Biology without Boundaries', six review presentations on various aspects of turtle biology were presented. I would like to thank Jeanette Wyneken who organized this special session.

From 5<sup>th</sup> through 7<sup>th</sup> April, 101 oral and 340 poster contributions were presented, covering the following standard sessions: Behavior and Movements; Conservation, Management and Policy; Population Biology and Monitoring; Fisheries Interaction; Anatomy, Physiology and Health; Ecology and Evolutionary Biology; Social Science Research; Education, Outreach and Advocacy, plus two special sessions: Turtles and Climate Change, and Ecological Roles of Marine Turtles. We tried to create an agreeable atmosphere for poster sessions and we installed them close to

the coffee break area and an always-open bar with a view of the blue Aegean Sea. However, the large number of posters did not allow us to have all posters set up for the whole Symposium's duration.

On 6<sup>th</sup> April, a Panel Discussion, organized by the Western Pacific Regional Fishery Management Council and named 'Cooperative Approaches to Implement Sea Turtle Bycatch Solutions in Longline Fisheries', took place on the global issue of longline turtle captures.

On Saturday, 8<sup>th</sup> April, the usual Annual Meeting of the IUCN's Marine Turtle Specialist Group took place with regional reports from the Regional Chairs and a discussion on the Global Burning Issues. On Saturday afternoon the Freshwater and Terrestrial Turtle Workshop took place, which gave emphasis to regional issues.

#### *The Archie Carr Student Best Paper Competition*

Nine awards were given to the best and runners up student oral and poster presentations in two major categories: Biology and Conservation. In total, 146 student presentations presented by 111 student candidates were examined by the Judging Committee. The award certificates were accompanied by a small honorarium and a subscription to Chelonian Conservation and Biology; in total 2,000 USD and 1,000 Euro were awarded to the nine students. Half of the totally awarded sum came as usual from the Chelonian Research Foundation (thank you very much, Anders). I thank the co-chairs of the Judges, Lisa Campbell and Jeanette Wyneken, as well as the 22-member Judging Committee for this important task.

#### *Travel Grants*

In total, 131 travel grants were distributed, either as cash or as "free" rooms, through generous donations from Western Pacific Fishery Management Council, US Fish & Wildlife Service, US National Marine Fisheries Service, UNEP's RAC/SPA, Disney's Animal Kingdom, Chelonian Research Institute (CRI), Marine Conservation Society (MCS), WWF Italy, Bern Convention (Council of Europe), Leatherback Trust, the CCC and the IUCN Centre for Mediterranean

Cooperation. Also many smaller donors and "room sponsors", too many to mention here. I must note here the serious constraint that the President has to face when asked by the Travel Committee "how much" we should give for grants. Initially, I allocated 53,000 USD, which later was increased to about 56,000 USD. Pending final evaluation by ISTS Treasurer Ed Drane, I can say that, in general, we did very well financially. The problem is that we didn't know this before allocating the travel grants. Here it comes the need for a Reserve Travel Fund, which will allow next Presidents to know in advance how much funds can be available as grants, with a decent degree of certainty. I should mention here the great efforts (and successes) by Manjula Tiwari, Angela Formia, Susan Ranger and Rob Tryland in securing special funds from the CRI and the MCS for our colleagues from Africa; a major objective of this Symposium. A brilliant idea of Susan was that the left-over money from those grants will remain earmarked for Africans for the next Symposium!

#### *Simultaneous interpretation*

Thanks to the UNEP/MAP's Headquarters, based in Athens, we were able to have simultaneous interpretation to French during the Africa Meeting and during the first day Plenary. Unfortunately the high costs of having two sets of translators, plus equipment, did not allow us to have translations during the subsequent concurrent sessions.

#### *Involvement of the media*

An early advice from Earl Possardt, President of the 22nd STS, was to involve as much as I could the media in order to make public some important sea turtle topics. Thanks to the support of Conservation International (CI) we were able to set a Press Room, equipped with computers, fax and internet and to have the expert involvement of the CI's Global Communications Task Force, represented in Lisa Bailey, who together with Dimos Tsandilis and Theoni Karkoulia of ARCHELON were assigned to liaise with journalists, to find the appropriate experts for interviews and to draft news releases in English and in Greek. Two journalists from far-away lands (Colombia, Indonesia) stayed on-site and covered fully the event, while several local journalists were

in and out. Various Symposium events appeared many times in local, national and international media. In addition, a daily blog hosted at conservation.org, and another one (in Greek) at the website of ARCHELON, were set to inform journalists who could not attend the Symposium.

### *Local Participation*

We have tried to involve the local community on Crete as much as possible. In this regard, schoolteachers of Heraklion were informed well before about the Symposium and prepared and implemented various activities in the schools of Heraklion, inspired by sea turtles. One result of these activities were the handicrafts, made by the children, exhibited during the Symposium at the Poster Area. I would like to thank the originator of this activity and member of ARCHELON Board Mr Helias Pitsikas, as well as the Head of the Education Department of Heraklion Mr Dimitris Apostolakis. Further, a meeting with local fishermen took place in the nearby harbour of Rethymno to discuss ways of mitigating turtle captures. It is worth to note that these fishermen participated in the Mediterranean Reunion, together with the local Fisheries Department officials and the Coast Guard and presented their views.

### *Entertainment*

The best part of the Symposium. On Tuesday, during the Welcome Cocktail we had the Cretan dancers, young women and men, with the local musicians playing the “lyra” (an ancient instrument – mythology says that Orpheus had his lyra made of a tortoise shell). I will include the Auction in this section. Silent Auction gathered a great many things, well arranged and organized by the Auction Chair Theodoros Benos-Palmer. The live Auction was a success both as entertainment (it was the peculiar exotic drinks that Rod Mast took care to sell first) and also as an additional fund (more than 13,000 USD were collected on-site, through the expert cashiers of the Hilton Head Protection Project, brought to Crete by Ed Drane). Thank you Rod! Thank you Ed! Thank you all those who donated all these lovely items!

When we were drafting the Symposium schedule, we called the traditional Symposium banquet a “Farewell Party” because we didn’t know, until the last minute, what and where to do it. They were ideas of having it right “on the hotel’s beach”, or at the open theater, or even outside the hotel compound in one of those huge places, very common in Crete, where weddings are celebrated in a Cretan-style manner. Since no weddings were in sight we resorted in the relative safety of the hotel dining room. The food was excellent, thanks to the always-checking-the-details Thanos and the abundant home-made raki, a very welcome gift of the local Prefect.

Now, I want to say few words about dancing. As we all know, dancing is a form of self-expression. This is very conspicuous in the case of Greek dances; thus the many forms of them, especially the solitary ones. When I was dancing with Mike Coyne, the new President, the Zorba dance I wanted to show you the steps of an easy Greek dance with the hope that some of you (at least) would dance on your own. However, when we finished and the band started to play Greek tunes I was truly amazed to see latinos, middle-easterners and even northern Americans to inundate the dancing floor, leaping and circling with amazing grace and long-time expertise.

Closing my report for the 26<sup>th</sup> Symposium, I should mention the long preparatory work done by the personnel of ARCHELON, as well as of the Symposium Coordinator Thanos Belalidis, without whom the Symposium wouldn’t happen. I thank all participants, all sponsors and donors, all members of Committees and Task Forces, the staff of ARCHELON and all Symposium volunteers for making this event a memorable one.

### **ISTS Business**

The International Sea Turtle Society (ISTS) is doing great steps forward. These were extensively discussed at the BoD Retreat in August 2005 and also at the BoD Meeting on Crete. Three major issues were presented at the ISTS Plenary Business Meeting on Crete (7 April): nominations, resolutions, modifications of by-laws and constitution.

### *Nominations & Elections*

A very clear procedure was announced through MTN, the ISTS website and individual messages to all members, setting a deadline for nominations on 15 November 2005. The 5-member Nominating Committee (NC) had set criteria and evaluated each received nomination. Eventually, the BoD decided to present to the membership a multiple slate for the 2 BoD & the 2 NC positions, and also to accept nominations from the floor during the Plenary. I think that this is a good measure that enhances participation and upgrades transparency and democracy. Following a secret ballot, the following candidates were elected: Ana Barragan and Naoki Kamezaki for the BoD positions, and Scott Eckert and Alberto Abreu for the NC. The BoD slate for the Executive Committee presented by NC (i.e. President-Elect: Wallace J. Nichols, Treasurer: Edwin Drane, Secretary: Manjula Tiwari) was unanimously voted. At this point, I would like to congratulate the new members and also to thank very much for their contribution the departing BoD members Frank Paladino and Clara Padilla, the past president Nicolas Pilcher, and the NC members Matthew Godfrey and Neca Marcovaldi.

### *Resolutions*

As discussed in a previous article (Margaritoulis, MTN 110: 10-11) there has been skepticism within the BoD as regards the effectiveness of resolutions. Further, the existing procedure was cumbersome, provided little time for deliberations among the BoD members and needed some persistent work for following up. There have been proposals to substitute resolutions for a more effective advocacy strategy. To confront the above, and following a rationale from a task force, the procedure for submitting resolutions became more clear and strict, and a Resolutions Committee (RC) was created, including Jack Frazier, Jeff Seminoff, Kartik Shanker, Manjula Tiwari, in order to handle the matter of resolutions in a more efficient way. This initiative has already been successful. In the context of the 26<sup>th</sup> Symposium, four resolutions were accepted by the RC and the BoD, plus one that was tabled from the previous Symposium. All five resolutions were adopted by the Plenary Business Meeting on Crete, and are the following:

1. Resolution to support the adoption and implementation of the UN Food and Agriculture Organization's "Guidelines to Reduce Sea Turtle Mortality in Fishing Operations" by Parties to regional fishery management organizations and sea turtle agreements.
2. Designation of Puerto Rico's Northeastern Ecological Corridor as a Nature Reserve.
3. Resolution to Minimise Disturbance to Nesting Loggerhead Turtles (*Caretta caretta*) by Tourist Activities on the Island of Zakynthos, Greece.
4. Resolution on the Need to Strengthen and Implement the Recovery Plan for Kemp's Ridley.
5. On the Need to Strengthen Protection of the Kemp's Ridley Sea Turtles by Creating a Texas-Mexico Protected International Swimway.

You can find the above resolutions in the Symposium website. All were duly dispatched to the competent authorities and, as a good sign, we have already received some constructive replies from them. I must thank all members of the RC but above all the Resolution Chair Jack Frazier.

### *Modification of the ISTS by-laws and constitution*

The ever-expanding mandate and international character of our Society asks for changes in its instruments and procedures; thus the necessary modifications of these documents. Thanks to the dedicated work of Frank Paladino and Nancy FitzSimmons, the BoD came up with a draft of the proposed changes, which were approved by the membership at the Plenary Business Meeting on Crete. Modification of by-laws is a lengthy process, and needs the input of as many members as possible in order to be able to have long-lasting, modern and flexible rules that will govern our society.

Concerning the ISTS business, I would like to express my thanks to the members of the Executive Committee (Michael Coyne, Thane Wibbels, Edwin Drane, Manjula Tiwari), the Board of Directors (Clara Padilla, Frank Paladino, Milani Chaloupka, Jeffrey Seminoff, Hedelvy Guada, Donna Shaver, Nancy FitzSimmons, Lisa Campbell, Brendan Godley, Kartik Shanker), and the 3 past presidents participating at the BoD meetings (Nicolas Pilcher, Roderic Mast, Thane Wibbels).

## The Role of the IUCN Marine Turtle Specialist Group in Setting Priorities for Sea Turtle Conservation

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### Annual MTSG General Meeting 2006

Sea Turtle Symposium XXVI on the Island of Crete served as the venue for the 2006 Annual General Meeting (AGM) of the MTSG, which took place from 09:00 – 13:00 on Saturday, April 8. A new format was adopted for this AGM, different from recent years in that the Co-Chairs invited presentations from Regional Vice Chairs on MTSG-related activities in their respective areas of influence. Following these presentations, an open-mike session was conducted at which numerous issues arose pertaining to priority-setting, and in particular the procedures, processes, and controversy relating to the Red Listing of sea turtles. Given the importance of this topic to the work of the MTSG and its implications on conservation and research as a whole for our field, the authors felt that it would be a worthy topic to address in this article. Full minutes from the AGM are available on the MTSG website <<http://www.iucn-mtsg.org>>, along with copies of the presentations made by the Regional Vice-Chairs. As always, MTSG members are encouraged to review these materials, and to communicate directly with the Co-Chairs at <[mtsg.co-chairs@conservation.org](mailto:mtsg.co-chairs@conservation.org)>, or among members of the regional sub-groups using the relevant email listserves.

### Setting Priorities for Sea Turtle Conservation

The MTSG envisions “*marine turtles fulfilling their ecological roles on a healthy Planet where all peoples value and celebrate their continued survival.*” This is a worthy direction in which to head for sure, but as we settle-in to determining

how we actually move toward it, we find ourselves wondering where to begin, and how to proceed in the face of numerous constraints. Priority setting is critical to the success of any conservation effort. The MTSG approaches global-scale taxonomic priority setting through the IUCN Red Listing process, and we also use IUCN Red Listing methodologies to take taxonomic priority setting to the regional scale. The MTSG uses the annual Burning Issues Assessment to further refine priorities that combine taxonomic with hazard-based considerations at global, regional and local scales. Moreover, the MTSG partners with the State of the World’s Sea Turtles (SWoT) initiative to develop a global database which, over time will allow our community to monitor global-scale trends. The first *State of the World’s Sea Turtles (SWoT) Report* was released on March 20. It contains the first-ever comprehensive, up-to-date, global-scale map of leatherback nesting, plus a variety of articles presenting a clear picture of the present status of sea turtles and related conservation efforts around the world. A new website was launched at <<http://www.SeaTurtleStatus.org>>, as a source of information and conservation tools associated with SWoT. In the sections that follow, we provide updates on these endeavors.

### Red Listing

One of the responsibilities of the MTSG is to use its global network to conduct regular assessments of sea turtle species, to be included in the IUCN-World Conservation Union’s *Red List of Threatened Species*, which attempts to provide a global overview of plants and animals at risk of

extinction. *Red List* assessments have been extremely valuable in defining conservation priorities such as Important Bird Areas (IBAs), Key Biodiversity Area's (KBAs), as well as Hotspots, Major Tropical Wilderness Areas, and Eco-Regions. The *Red List* criteria have evolved over decades, and are generalized to be useful for all types of organisms. Not surprisingly, the "one size fits all" framework of the Red Listing Criteria poses distinct problems when assessing things in Nature. For instance, the criteria call for analyzing data for "ten years or three generations, whichever is longer," which for sea turtles could require reliable data sets of nearly one hundred years duration, something rare for sea turtles. Because of

the nature of sea turtles, "Endangered" on the *Red List* may not equate to a high risk of extinction in the wild, as it might with lesser ranging taxa such as amphibians or terrestrial mammals; moreover, the *Red List* cannot appropriately address threats to smaller populations, nor provide regional or local resolution requisite for conservation planning on these subglobal scales. The shortcomings of the *Red List* criteria for sea turtles have been addressed on several past occasions (Mrosovsky 2003, Mrosovsky 2006; Seminoff 2004; Webb & Carillo 2000). Nonetheless, despite their limitations, evaluations of sea turtle status as per the *Red List* criteria are a valuable tool for influencing policy and for conservation priority-setting.

**Table 1.** Summary of Red List Status for the world's seven sea turtle species.

<i>Species</i>	<i>Red List Status</i>	<i>Year Assessed</i>	<i>Assessor</i>
Leatherback	Critically Endangered	2000	L. Sarti- Martinez
Hawksbill	Critically Endangered <sup>1</sup>	1996	RL S & PS
Kemp's ridley	Critically Endangered	1996	MTSG
Olive ridley	Endangered <sup>2,3</sup>	1996	RL S & PS
Loggerhead	Endangered	1996	MTSG
Green	Endangered	2004	J. Seminoff
Flatback	Data Deficient <sup>4</sup>	1996	RL S & PS

<sup>1</sup> This revised assessment is a ruling made by the Red List Standards and Petitions Subcommittee (RL S&PS) in response to a petition that challenged the Critically Endangered status (for further details see the IUCN SSC web site).

<sup>2</sup> This revised assessment is a ruling made by the Red List Standards and Petitions Subcommittee (RL S&PS) in response to a petition that challenged the Endangered status (for further details see the IUCN SSC web site).

<sup>3</sup> The MTSG is currently drafting a response to an official appeal to IUCN for MTSG to develop a new assessment based on 2001 Red List Criteria.

<sup>4</sup> This revised assessment is a ruling made by the Red List Standards and Petitions Subcommittee (RL S&PS) in response to a petition that challenged the Vulnerable status (for further details see the IUCN SSC web site).

Global Red List assessments are intended to be updated every 10 years. Done properly, a *Red List* Assessment requires broad consultation and can take thousands of hours to complete. Given the enormity of the task and the available volunteer-power to conduct it, the MTSG has lagged behind schedule in conducting re-assessments, though we intend to catch-up in the coming three years. In cases in which assessments were conducted more than ten years ago, the most recently conducted assessment is maintained in the *Red List* (Table 1). The MTSG Red List Focal Point is Jeffrey Seminoff, assessor of the 2004 Green Turtle

Assessment, who serves as the official MTSG liaison with the IUCN Red List Authority in the UK, as well as the coordinator of the individuals and teams involved in the re-assessment work. An itinerary for completion of the remaining assessments has been developed by the authors (Table 2), compilers have been selected, and in some cases are already at work. In addition, the MTSG has raised money for stipends to the assessors and their collaborators, and to offset communications and research costs involved in preparing the global re-assessments.

**Table 2.** Summary of ongoing MTSG sea turtle assessments

<i>Species</i>	<i>Spatial Resolution</i>	<i>Assessor Expected</i>	<i>Completion Date</i>
Hawksbill	Global	J. Mortimer	2006
Loggerhead	Regional (Mediterranean)	B. Lazar w/others	2006
Leatherback	Regional (Mediterranean)	P. Casale	2006
Green	Regional (Mediterranean)	A. Demetropolous	2006
Olive ridley	Global	A. Abreu-Grobois w/others	2007
Loggerhead	Global	B. Lyon	2008

A regional approach would clearly benefit sea turtle status assessments and conservation efforts, but it is important to keep in mind that such assessments may not always qualify for inclusion on the *IUCN Red List*. Simply stated, the *Red List* only includes regional subpopulations that are genetically isolated, a qualification that is impossible to meet for most regional populations. For a highly migratory taxon such as sea turtles, the global crisscrossing undertaken by individuals often maintains high gene flow, and thus, lack of isolation of many stocks. However, exclusion from the *Red List* is by no means a reason not to undertake such assessments. It is with this in mind that the MTSG is working toward the development of Regional assessments for sea turtles throughout the world; the first of which are MTSG assessments for green turtles, loggerheads, and leatherbacks in the Mediterranean Sea. To complete similar assessments for all regions and all species will take years, but we are nonetheless confident that their development will ultimately lead to more informed conservation planning and action.

On April 27, 2006, the MTSG Co-Chairs and Red List Focal Point, after consultation with Mediterranean Regional Vice Chair, Dimitris Margaritoulis, elected to withdraw the listing of the Mediterranean green turtle as Critically Endangered. Although there is equivocal evidence of genetic isolation for this regional population (an important qualification for inclusion on the *Red List*), the lack of documentation for the original Mediterranean green turtle assessment called for a removal of this listing. Further, because the original assessing organization no longer exists, we were unable to answer important questions about what data were used in the original assessment.

However, as mentioned, the MTSG (with Andreas Demetropolous as the assessor) is currently drafting a regional assessment for green turtles in the Mediterranean. Although this document was originally planned to be a non-*Red List* assessment (see above), we will submit this assessment for inclusion in the *Red List* if, as indicated by some of the members from the Mediterranean, we are able to unequivocally demonstrate the genetic distinctiveness and isolation of this regional population.

**The Burning Issues Assessment**

The Burning Issues Assessment endeavors to go a step further than the global-scale Red List, with the intent to encourage on-the-ground conservation action in the places where experts agree they are most urgent and can have the largest impact in preventing extinctions. The first Burning Issues Assessment was undertaken in late 2003 (see [MTN 104:20-22](#)), and this was followed up by a second Burning Issues Assessment (BI2) conducted by a group of MTSG members hailing from several countries and representing knowledge of all the world’s major sea turtle stocks, who gathered in Washington, DC in August 2005 (see [MTN 110:13-15](#)). One of the products from this gathering was a draft Top Ten List of most threatened global sea turtle populations.

The Top Ten List draws attention to some of the sea turtle *populations* that are most in need of *urgent* conservation attention, considering one or more of the following criteria: recent precipitous declines, small population size, high degree of threat, or irreplaceable nature. It is a dynamic assessment that attempts to include all the major regions where sea turtles live, and it is based on

best available data and expert opinion as its principle resources. The Top Ten List is reviewed annually to assure its accuracy and timeliness. It is part of a larger priority-setting process for sea turtle research and conservation that also includes a list of Critical Research Needs, recognizing that for many areas of the world and populations of sea turtles we simply do not have enough data to accurately assess urgency and degree of threat.

The results of the BI2 meeting were used in the production of a poster that outlines the global Hazards to sea turtles, and the Top Ten Most Threatened Sea Turtle Populations; copies of the poster can be seen at <http://www.SeaTurtleStatus.org>, or obtained by contacting the MTSG Program Officer, Brian Hutchinson (see address above). Drs. Alan Bolten and Milani Chaloupka are Co-Chairing BI3, to take place in Washington, DC in August 2006. The BI3 gathering will be preceded by a membership-wide email survey to help fine-tune and add depth to the Top Ten List.

**Conclusion**

The realities are these: Nowhere on Earth are sea turtles thriving as they have in past centuries, and the ubiquitous threats to their continued survival are more intense than ever in history. There are sizeable gaps in even our simple descriptive knowledge of sea turtles and their habitats, and an understanding of their “ecological roles” is still well outside our grasp, floating in a sea of inter-related mysteries about life on Earth. To make things even more challenging, even if we did know

enough about turtles to properly conserve them, we would still need to muster the needed financial and human resources, not to mention the political will to take on the countless conservation interventions that would be needed to properly pursue the MTSG’s audacious vision.

Time is not on our side, and we cannot wait to act. We must approach our conservation actions as wisely as we know how; we must constantly measure and monitor our results; and we must be prepared to change our approaches as new information becomes available. Hence, it is of the utmost importance that we select priorities as strategically as possible, always based on the best available science, and the best available scientific opinion when data are lacking. We must focus our research and conservation attention on those taxa, regions, habitats and hazards that are most critical to preventing extinctions and other irreversible damage.

Broad participation and consensus building is important to the success of all of the aforementioned priority setting efforts. We again encourage the nearly 300 MTSG members worldwide to become more engaged with the work of the MTSG through such efforts as the IUCN Red Lists, the Burning Issues Assessment, and SWoT. Visit our website, use our listserves, participate in the numerous annual gatherings where subsets of us congregate in pursuit of the MTSG vision. We are a powerful volunteer network that depends on each of you to contribute time and expertise.

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## Research summaries on sea turtles

### Summaries by and Mark Hamann<sup>1</sup> and Matthew Godfrey<sup>2</sup>

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**Gratiot N., J. Gratiot, L. Kelle, B. de Thoisy. 2006. Estimation of the nesting season of marine turtles from incomplete data: statistical adjustment of a sinusoidal function. *Animal Conservation* 9: 95-102.**

Throughout the world many governments, communities and NGOs have established and maintained monitoring programmes for nesting sea turtles. In general, one of the objectives of these programmes is to develop an estimate of annual population size (i.e. the number of females breeding per year) and inter-annual population trends (i.e. variation in the number of breeding females over years). However, obtaining estimates of the population size is difficult because it is often too expensive, or logistically not possible, to conduct beach surveys for each night during a nesting season that may run for many months. The difficult question in these cases is how often and how long is monitoring required to provide accurate estimates of population size.

Gratiot and colleagues have addressed this pertinent question by conducting statistical modeling on datasets collected from two species nesting in French Guiana. In both species nesting occurred for several months of the year with a distinct mid season peak that lasts one to two months. Their two main findings were (1) that

estimates of total annual population size based on various intervals of continuous nesting beach surveys were most accurate when surveys of ~50 days in length were conducted and (2) if continuous nesting beach surveys can not be conducted over the peak of the season, or if it is not possible to conduct continuous monitoring, then data collected during 30 days of monitoring conducted randomly throughout the nesting season can be used to provide a reasonable estimate of annual population size.

It is refreshing to see mathematical approaches being taken to try and strengthen the ability of data sets collected at nesting beaches to detect population trends. This will ultimately improve the ability of management agencies to define monitoring objectives and monitoring programs that are complementary. The challenge now will be to develop this or similar methods for other species, populations and rookeries that have year round or bi-modal nesting; and test their applicability in assessing previously collected datasets.

**Koch V., W.J. Nichols, H. Peckham, V. de la Toba. 2006. Estimates of sea turtle mortality from poaching and bycatch in Bahia Magdalena, Baja California Sur, Mexico. *Biological Conservation* 128: 327-334.**

There are two populations of loggerhead turtles in the Pacific Ocean; southwestern Pacific (e.g. Australia) and northwestern Pacific (e.g. Japan). Both these populations of loggerhead turtles have

undergone well documented declines over the last one to two decades. Over the last decade it has emerged that the waters of the eastern Pacific are important nursery or juvenile habitats, and the mid

oceanic waters are important foraging and migratory habitats for loggerhead turtles that breed in the eastern Pacific. A crucial aspect that needs to be addressed to enable the successful implementation of management practices to help stem declines in nesting numbers in both the southern and northern Pacific is to identify and quantify threats.

Koch and colleagues have addressed this by quantifying sea turtle mortality in Bahia Magdalena Bay in Baja California. They report close to 2000 dead turtles in three years; mostly loggerhead (44%) and green [black] turtles (37%) and these were a combination of beach washed carcasses with no known cause of death and animals caught in nets for consumption. This translates to an annual minimum mortality rate of around 250 loggerhead turtles in this small geographic area of Baja alone. Although genetic work was not presented it is likely that these turtles

are mostly from the northern Pacific nesting population. The authors highlight that irrespective of any unrecorded mortality in other areas in Baja, the mortality rates indicated in their study combined with other published data on mortality from high sea long lines or coastal gillnets are likely to hinder the effectiveness of long term conservation work on the nesting beaches in Japan.

In the Southeast Asian region bycatch of marine turtles occurs in the trawling and gillnet fisheries of many countries. In addition, most southeast Asian sea turtle conservation projects, while acknowledging off-shore mortality, have focused on nesting beach protection. Without the quantification of offshore, or indeed overseas, mortality of sea turtles, management of nesting populations will remain problematic. The data presented by Koch and colleagues will certainly aid in the development of management programs for loggerhead turtles within the Pacific Ocean

**Broderick, A. C., R. Frauenstein, F. Glen, G. C. Hays, A. L. Jackson, T. Pelembe, G. D. Ruxton, and B. J. Godley. 2006. Are green turtles globally endangered? *Global Ecology and Biogeography* 15: 21-26.**

Sea turtles are endangered. Or are they? The answer to this question depends on several things, including: a) the definition of the term endangered and b) the geographic scale that is being considered. The World Conservation Union (also known as IUCN) publishes the Red List of endangered species that provides information on the risk of extinction of different species, based on a clear set of criteria (see [www.redlist.org](http://www.redlist.org) for more information). The Red List assessments are done on a global scale. In the case of sea turtles, six species have been assigned “endangered” or “critically endangered” status by the Red List. The exception is the flatback turtle that is designated as “data-deficient” because not enough historical data are available for proper assessment. In 2004, the global status of the green sea turtle was assessed and determined to be “endangered” according to Red List criteria. By definition, “endangered” means that the global population of green turtles has declined by more than 50% in the last three generations of turtles (calculated as 106-150 years – see [www.iucn-mtsg.org/red\\_list](http://www.iucn-mtsg.org/red_list) for more details).

What if you consider green turtles at a regional rather than global scale? That is the subject of the recent publication by Annette Broderick and her co-authors. They present data on green turtle nests from Ascension Island, which is located in the middle of the Atlantic Ocean. Central to their argument, they show that although the island’s green turtle population suffered a decline that was related to intensive harvesting of females between the early 1800s and the early 1900s, in the last several decades this green turtle nesting population has been growing at an exponential rate with an expected reduction in the rate of growth. The nesting population of Ascension Island is now nearly as big as it was estimated to be in the early 1800s – thus it would not qualify as “endangered” if it were assessed independently. However, an assessment based on one population also has associated problems; to counter this Broderick and her co-authors point out that Ascension Island is not the only green turtle rookery in the Atlantic for which data show an increasing numbers of nests laid. In particular, the large populations in Tortuguero (Costa Rica), Bijagos (Guinea Bissau),

Yucutan (Mexico), Suriname, and Florida (USA) are all increasing. I would add to the list Trindade Island (Brazil) and western French Guiana where there is no evidence of a decrease over the past few decades or based on historical data. It is important to note that there are a few places in the Atlantic Ocean where nesting numbers have declined in recent years, including Aves Island (Venezuela) and Bioko (Equatorial Guinea), but overall the largest rookeries are stable or increasing. As a result, Broderick and her colleagues suggest that the Red List status of sea turtles be assessed on a regional scale, and in the case of the Atlantic Ocean green turtles should not be listed as “endangered.”

One might ask why this matters. In particular, some people have argued that having sea turtles listed as “endangered” or “critically endangered,” regardless of the Red List criteria, can only help sea turtles and sea turtle conservation, so there is no reason to alter the Red List status of any sea turtle populations. The issue boils down to credibility. A primary purpose of the Red List (and its categories of “endangered” and “critically

endangered”) is to provide a relative index of likelihood of extinction. If all green turtles in the world are listed as endangered (as they currently are), then all nesting populations should receive equal effort in protection and conservation actions. However, there are some places in the world where green turtle populations are declining, and they should receive more attention and effort than those that are increasing. For instance, the green turtle nesting population in Michoacán (Pacific Mexico) has greatly declined in recent decades and deserves a high level of concern and effort in conservation actions, relative to the population at Ascension Island. Yet, the current global classification by the Red List does not distinguish between these two nesting populations in terms of risk of extinction. For these reasons, Broderick and others have called for a change in the current system of assigning Red List status; specifically they recommend that regional assessments (as opposed to global assessments) be pursued, as a means to more adequately focus conservation activities on those populations that greatly need it.

**Taquet, C., M. Taquet, T. Dempster, M. Soria, S. Ciccione, D. Roos, and L. Dagorn. 2006. Foraging of the green sea turtle *Chelonia mydas* on seagrass beds at Mayotte Island (Indian Ocean), determined by acoustic transmitters. *Marine Ecology-Progress Series* 306: 295-302.**

Green turtles are largely herbivorous, eating either seagrasses or algae as juveniles and adults. However, relatively little is known about their foraging or other in-water habits given the logistic difficulty in observing sea turtles in the water. Recent technological advances in tracking devices such as satellite tags are helping to describe previously unknown migration patterns between nesting and foraging areas. Yet, there are limitations to satellite tags. For instance, the location information is usually only collected when the turtles are at the surface of the ocean while breathing. Also, many locations derived from the satellite tags have a large range of error associated with them, making it difficult to pinpoint exactly where the turtles are or have been. Another commonly used method is sonic telemetry. This involves attaching a small transmitter to the turtle and then, unlike satellite telemetry, a hand held receiver is used to detect signals and locate turtles while they are underwater. Traditionally this

method has been used to pinpoint the exact location of turtles at sea. One drawback of sonic transmitters and the use of hand held receivers to detect turtles is that their effective range is relatively short (less than 1000m). This has meant that researchers usually have to patrol zones continuously to detect and then pinpoint where the tagged turtles are and observe what they are doing. This kind of direct observation may have an impact on the turtles themselves, if researchers are forced to bring their boats or swim in the water nearby the turtles in order to study them.

In the publication above, Taquet and her colleagues describe how they attached sonic tags to green turtles and used a novel system involving an underwater grid of stationary sonic receivers to remotely monitor their activities in and around a seagrass bed in Mayotte. In this way, they were able to monitor several turtles at a single time while eliminating the possibility of altering the

behaviour of the turtles due to the presence of the researchers nearby. After 31 days of monitoring, it was found that the green turtles (adults and a single large juvenile) largely foraged during daylight hours, although some also foraged at night when there was sufficient moonlight available to illuminate the seagrass bed. The researchers also found that the turtles tended to favour a certain part of the seagrass bed.

This study contributes to increasing our understanding of in-water behavior of sea turtles and also provides a novel method for remotely monitoring their small-scale movements. It is likely that in the future, new technological advances will facilitate the study of detailed in-water behavior. In the meantime, the monitoring system described by Taquet and collaborators will likely inspire other researchers to pursue similar studies of turtles elsewhere.

## NOTES

### Take of sea turtles in Tamil Nadu and Kerala

During the first week of January 2004, I was surveying the coasts of Tamil Nadu and Kerala for sea turtles to extract tissue/blood samples for a conservation genetics project of the Wildlife Institute of India (WII), Dehradun, and Centre for Cellular and Molecular Biology (CCMB), Hyderabad. I saw numerous sea turtle carcasses in many places along the coast in Tuticorin and Kanyakumari District (Tamil Nadu) and Vizhingam fishing base in Kerala. These mostly comprised olive ridley turtles. At many coastal villages such as Thirespuram (Tuticorin District), it was common to find turtles tied with a cord and left in shallow water pools near the beaches, waiting to be slaughtered and sold. There was a set protocol in terms of the place and time in the fish market for selling turtles. Turtle meat was usually

sold on Sundays and interestingly, people normally slaughtered or bought turtles only after attending church.

Generally, the turtles are placed upside down and cut open from the flipper. Fresh blood is collected in a vessel and distributed free of cost. The meat is sold at around Rs. 30-40 per kg. The take of turtles in this region is a traditional practice, but its current impacts on the stocks are unknown. Under the current legal framework, it is illegal as these sea turtles are listed in Schedule 1 of the Indian Wild Life (Protection) Act, 1972. Since the turtles are caught both intentionally and unintentionally (particularly while fishing), this threat needs to be addressed as soon as possible.

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## Vijaya, India's first woman herpetologist

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### J. Vijaya

*This article is dedicated to J. Vijaya (1959 – 1987)*

When you delve into the history of herpetological conservation in India, as I did recently, you keep bumping into one personality called J. Vijaya. I have never met her and all I knew of her was that she spent most of her short life working on turtles and that there is a small memorial to her right next to the turtle pond at the Madras Crocodile Bank. Viji (as Vijaya was called) was India's first woman herpetologist when such a career was unknown in this country.

#### Student days

Viji came to the Madras Snake Park as a volunteer in late 1975. She was then a first year zoology student at Ethiraj College, Chennai. She assisted the keepers in cleaning the cages, made sure that visitors didn't throw stones at the animals, helped in the office and library and filled in for anything else that needed doing. Shekar Dattatri, then a school boy, joined the Snake Park as a volunteer a few months later and remembers her as a very quiet person with the insular, focussed interest of a Dian Fossey. While Shekar played truant from school and spent all week hanging around the Snake Park, Viji could only visit on weekends. Besides doing little projects at the Snake Park, the

duo went on short field trips together with the Irula tribals – to Vellore looking for rock lizards, to Mambakkam, Ottiyambakkam and Chitlapakkam and other places looking for small creatures like scorpions, lizards, snakes and geckos. Caring for animals in captivity at the Snake Park and observing wild ones in their habitat was a steep learning curve.

The first published mention of Viji surfaces in the September 1980 issue of Hamadryad, the newsletter of the Madras Snake Park in its early years and later Madras Crocodile Bank, when she wrote a short note on the breeding behaviour of mugger crocodiles. A September 1981 editorial mentions that she was working as a Research Associate on a project (which included checking wild scats and feeding captives) to assess the effectiveness of monitor lizards as rat predators. She had graduated by then and was working full-time at the Snake Park.

#### A turtle biologist is born

In those early days, when herpetological conservation was still nascent, Romulus Whitaker, her boss at the Madras Snake Park was assigning

various people to different critters – Satish Bhaskar to nesting sea turtles, Valliappan to sea turtles in the meat markets of Tuticorin – and he might have put Viji onto freshwater turtles. Once, Rom and a team from the Snake Park including Viji, went to the Indian Institute of Technology campus to catch a couple of crocs that had escaped from the Children’s Park Zoo. Near the edge of the huge sewage treatment ponds, they came upon hundreds of turtle eggshells, dug up and strewn around by mongooses. That was the first inkling they had about how common the Indian flapshell *Lissemys punctata* and the Indian black turtle *Melanochelys trijuga* were. Viji began collecting data on the turtles’ nest size, number of eggs per clutch and nest survival (precious few!) and that may have been the decisive moment.

Shekar remembers returning from a field trip to Sri Lanka with Viji clutching an old frayed bag of Indian black turtles. At the Customs check, she had to open the leaking bag for inspection when the turtles began pissing in unison. It made an already cumbersome procedure smellier. He laughed as he recalled affectionately, “She’d do things that I wouldn’t dream of doing.” At this time, Edward Moll, the Chairman of the World Conservation Union’s Freshwater Chelonian Specialist Group needed an assistant for a nationwide survey of turtles and Rom, who was a member of the group, recommended Viji, who was just 22 then, for the job.

### The first surveys

The survey got underway in August-September 1981 and she travelled up to West Bengal (the major consumer of freshwater turtles in the country) to meet up with Pankaj Manna of the University of Calcutta, the other team member. With Pankaj as translator, they began with the meat markets. Thousands of Indian softshell turtles *Aspideretes gangeticus* and narrow-headed softshell turtles *Chitra indica* came for sale during the winter months – when the water was low and the creatures were easy to trap, hook, or catch with bare hands. The price of turtle meat plummeted from Rs. 18 to Rs. 5 per kg during these months; “it was cheaper than beef,” Viji reported. From Gorakhpur, Uttar Pradesh, she wrote about the movement of the turtle trade – most went to

Bengal but some found their way to Assam. Initially turtle exploitation was confined to the states immediately around Bengal. But by the time of her visit, states further upriver like Uttar Pradesh (UP) were being hunted for the Bengali markets (Viji would eventually discover that turtle exploitation extended as far up as Punjab). On a typical day, 10 baskets of 10-20 turtles each, along with freshwater fish from reservoirs and rivers were sent by train from UP alone. The market was big and the business competitive; at least 20 agents worked the Rapti river. Viji also documented how turtles were caught by harpooning and hooking. The hapless turtles were flipped on their backs and their flippers stitched together with binding wire for the journey to Bengal. In 1981, the catchers were already complaining about the small size of turtles (5-10 kg. range); 10 years earlier they were easily able to catch 40-70 kg. ones. Based on Viji’s findings, Ed Moll estimated that 50,000 to 75,000 Indian flapshells, 7,000 to 8,000 large softshells and at least 10,000 to 15,000 hardshell turtles were coming into the Howrah market in Calcutta annually. He felt that the latter was probably an underestimate, because on one day in May 1983 (off-season), he witnessed over 350 large hardshell turtles being auctioned off.

It can’t have been easy doing this work as most of the places Viji visited were the ‘badlands’ or ‘wild west’ of India – the Chambal ravines with its dacoits, Bhagalpur (at the time of the infamous Bhagalpur blindings) and crowded, goon-infested parts of UP. But, she was totally oblivious to anything besides turtles. The black-and-white pictures she took of the gory ridley sea turtle slaughter on Digha beach in West Bengal and in the meat markets of Calcutta, shook the public when India Today magazine ran them in the early 1980s. This was the first media expose ever done on the free-for-all trade in sea turtles and highlights the difference one individual can make to conservation.

Prime Minister Indira Gandhi took action (another woman who dramatically affected conservation in India) immediately and overnight, sea turtle exploitation was cut to a trickle. Mrs. Gandhi also wrote to the Coast Guard asking them to protect sea turtles, a tradition that continues. Ironically, the present government has abdicated its role as

caretaker of India's wildlife by allowing ports and other developments along the coast that are detrimental to the turtles' continued survival.

### The forest cane turtle

The forest cane turtle (at that time *Heosemys silvatica*) was at the top of the agenda of the Freshwater Chelonian Specialist Group. Viji decided to go and look for the obscure little turtle in Kerala, which hadn't been seen for 67 years. Only two specimens of the species had ever been recorded by a Dr. Henderson (of the Madras Museum) in October 1911 from Kavalai. Henderson describes the locality as "20 miles from Chalakudy, the starting point of the forest tramway service." When Viji planned her trip, she discovered that 'Kavalai' meant 'crossing or junction', the tramway had long since fallen into disuse and every district in Kerala seemed to have a village by that name. She somehow made contact with the Kadar tribals in Chalakudy and sought their help. She wrote: "The 'Moopan', or headman, was appointed to accompany me as he was the oldest man available to accompany a girl into the forest. Moopan, whose actual name I was never allowed to address, was a dignified man, four-and-half feet tall with a serene face. Rain or shine, we would go out with his big umbrella and his sickle, which he used to chop off plants to make way in the jungle." She was finally able to find a cane turtle in July 1982 and that shot her into the international herpetological limelight.

Shekar remembers that first turtle well. "The first time Viji got one back to Madras, she brought it to my house. So long as it was daylight and as long as someone was watching it, the turtle would not come out. When it was pitch dark, it would slowly put its head out. The moment you shone a torch, it went back in. This was the most bizarre creature I've ever met." Perhaps what captured everyone's imagination most was that Viji saw wild cane turtles 'dive' under leaves when frightened, just the way an aquatic turtle would dive into the water. Henderson also recorded the fact that this turtle "did not affect the neighbourhood of water, a fact borne out by the absence of webbed digits."

In December 1982, one of the female cane turtles Viji brought back laid a clutch of two eggs. She

discovered that this species wasn't a vegetarian as earlier thought. Besides eating fruit and fungi, it fed on invertebrates such as millipedes, molluscs and beetles. From knowing virtually nothing about the animal, Viji made a quantum leap in documenting what this turtle was about.

Unknown to the scientists who considered the turtle 'lost' for close to 70 years, several cane turtles were sold in the European pet trade as Tricarinate hill turtle *Melanochelys tricarinata* or Indian black turtle in the 1960s and 70s. One of the turtle hobbyists who bought several was Reiner Praschag who maintained them in captivity in Austria for many years.

### Research and conservation

Rom remembers a clutch of Indian flapshell turtle eggs Viji had been incubating under a tin roof shed at the Croc Bank. It had already been about 300 days when Rom remembers writing them off as dead, but Viji persevered. The Irula tribals had told Viji that the sound of thunder makes turtle eggs hatch. A couple of weeks later, it rained for half an hour and on cue, the eggs hatched. Viji excitedly said that there had been no thunder; the rain beating on the tin roof was what did it. It would be wonderful to learn more about this intriguing aspect of turtle behaviour.

By the end of 1982, Viji had a captive breeding group of cane turtles and Travancore tortoises (*Indotestudo travancorica*) established at the Croc Bank. She set up a field camp in the Nadukkani forest, Kerala (a very remote and pristine forest, with the least damage wrought by fire) to study these two chelonians. It was several kilometres from the nearest Kadar village and it was a challenge to get there even on a good weather day. She lived alone in a cave, the former abode of leopards and bears, for several months at a time far from any help should anything have happened. Here she captured and notched 125 turtles; if any of these turtles were caught again she would know how far they had travelled after being released. She also extended the range of what was being called India's rarest turtle to the Neyyar Sanctuary in Kerala (200 km south of Kavalai), and to Agumbe in Karnataka (over 200 km north of Kavalai).

Shekar also mentions Viji's incredible sense of direction. He said anyone going into the forest with her didn't have to worry about keeping track of where they were going or mentally marking particular trees to find their way back. She could wander through an unfamiliar forest for kilometres, without stopping to take stock of her bearings, and yet unerringly find her way back without any effort. Besides, while the rest of the group was cautiously keeping an eye out for elephants, she merely strolled through paying no attention to leeches, ticks or elephants. She was completely at home in the forest and no inconvenience fazed her. In addition to capture-mark-releasing of turtles, Viji also carried out the first studies in Indian forests on tracking the movements of turtles. In 1983, Viji's operating budget was about Rs. 900 a month (including salary). There was no way that the Snake Park could afford radio telemetry equipment but she did the best she could with what was available. She stuck a spool of thread onto the carapace of the turtles with Araldite and let them wander. Following the thread, she could then get at least a general idea of daily activity patterns and even figure out the approximate home range of the animals she was studying.

*This article was first published in Sanctuary Magazine (Vol. XXVI No. 2, April 2006) and is based on interviews with filmmaker/conservationist (and one of Viji's few friends), Shekar Dattatri, Rom Whitaker and Ed Moll, her professor.*

## My sister Viji

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When Viji's remains were found in the summer of 1987, life turned to a sepia-toned freeze frame for us, her family. For years, my sister and I shared an intense relationship, so intense that I felt all her pain within my flesh and blood, but was helpless to change anything for the better. She was three years older than me and I loved her beyond measure and was even in awe of her. Months after she died, I would hold the locks of her curly mop in my hand and feel the body warmth emanate. If I could

## The end

Ed says Viji was an excellent field biologist whose best traits were her perseverance and her ability to observe. She did not have a strong biological background to interpret the data she was collecting and Ed invited her to Eastern Illinois University to do her Masters. In September 1984, Viji left for the States to do her post graduation under Ed Moll and later returned to India to do field studies. In April 1987, she was found dead, of unknown causes, in the forest she loved; she was 28.

## Epilogue

In 2006, 19 years later, her name was formally given to the cane turtle that she spent so much of her time studying – Peter Praschag, the son of Reiner Praschag, and several other herpetologists analysed the DNA of Reiner's now-dead turtles and recently re-named the turtle *Vijayachelys silvatica* in her honour. It is a monotypic genus, which means that there is no other turtle like it to share the name *Vijayachelys*. Just as there are very few other people like Viji.

have died instead, I would gladly have in a nanosecond. Years after she was gone, she communicated with me through amazingly surreal 3D dreams. As in life, she seemed intense, committed, exceptional and magnetic.

Ironically, as much as she crafted a facade of immense strength against the vicissitudes she faced in life, I was caught completely off guard at times by how vulnerable she really was. As a result, I

grew to be secretively very protective of her; she would have rejected any overt display of this. Nature was her real family. A special family where she belonged intrinsically, it was her special, secret retreat. When she transformed this passionate calling into her profession later in life, I think she invested all her energy and emotion into this family and expected a reciprocal investment. But when she went, she perceived herself quite alone and lost; the ground beneath her feet had caved in. Unfortunately, my family and I could help little, as she was already lost in the labyrinths of that world.

What made Viji special was her deep rooted commitment to the things she believed in, coupled with a strong sense of social justice. When she was a mere child in Bangalore in the early 1970s, we watched our perfectly 'normal' mother succumb to schizophrenia. Viji, then seven or eight, must have been terrified and helpless. But she transformed herself into a bulwark of strength that protected our mother from our grandmother's taunts, shepherded her sisters together and defended our family, with clenched little fists, against assaults from the outside world (our father was usually posted out of town on work). She became extremely sensitive to the underdogs of the world, unmindful of the cost. How much of a toll it took on that little girl I cannot even begin to fathom.

When she was only about eight, she taught us social justice by making us experience the life of the underprivileged. She made us cook rice in earthenware pots in the open and eat it with salt and green chilli pepper like the domestic help did at home. She taught me why not to use the word 'negro', after hearing a story from a granduncle in the army, which made a deep impression on her. To date, she is the only eight year old I know who invented three different class versions (super rich, middle class and dirt poor) of the same game.

Viji could identify planes high up in the sky by their tail lights, and converse with cats and dogs; she crafted 'expeditions' where the two of us would troop off to trace the mouth of the Coom River (and I didn't know how to swim and both of us nearly drowned in the sea when we got there). When she was 12 she shinned up vertical pipes three floors high and scared away two cooks from our house by waving at them from the window

while we anxiously watched from below with a prayer for a trampoline. For me, she was George in the *Famous Five* series, Jo in *Little Women* and Scarlett in *Gone with the Wind*. Like little Nan, she taught me how to strengthen myself emotionally by ramming my head at top speed into a wall!

As a child, she was enthralled by tales of Africa narrated by our granduncle, an army doctor who invented Bridge cards in Braille. She wrote a beautiful poem as a tribute to Africa, titled that. It featured the Serengeti and Victoria Falls and all the fauna she longed to see. She wanted to grow up in a hurry and work there. When we were in school, she collected old copies of National Geographic and made the likes of Jane Goodall, Dian Fossey, Birute Galdikas, Jacques Cousteau and Reinhold Messner her special heroes.

She used her pocket money to become a proud member of the Jersey Wildlife Trust when Gerald Durrell first launched it, and cried copiously when the Durrells broke up. When she was a schoolgirl, she befriended homeless animals of all sorts and brought them home to love. Our pets included monkeys, white mice, a chameleon, sand boas, and once, even a little fox. There was Massey, the bonnet monkey (she was banished from the main house for almost three days by my father for keeping it, but Viji finally won), Melvin (the flat nosed, pink cane turtle), Emma (the plain Tranvancore turtle she brought back also from the Silent Valley) and Millicent, the giant spider who birthed several hundred hairy children all over our bedroom. The plant she planted at my father's place is now a 22 year old giant, and shades the entire width of the road.

When we were kids in Bangalore, she would lead her sisters, Vid and I, into the real school of the world, through fields, rivulets. She taught us about birds and sounds, that baleen was the hair in the mouth of the whale to trap plankton, and that you used salt to ease leeches off your legs in the jungle. She taught us to handle a gecko's eggs carefully while cleaning the house so that they hatched. She taught us an alternate reality where eternal values like Truth and Beauty merged into a seamless spiritual whole.

Viji's choice of a vocation was a natural

progression. The day Rom Whitaker agreed to accept her as an assistant at the Snake Park, she was elated and took to her work like fish to water. That was in junior college. But as graduation drew near, she had to battle acute criticism, as with other decisions in her life. Even our rather progressive father suddenly had his doubts when he realised that Viji intended to become a 'glorified snake charmer'. Years of field trips, projects and research followed. These were really Viji's happiest, most fulfilling years, with Rom as her mentor. When she returned from the Chambal ravines, the Sunderbans or Silent Valley (both us attended protest lectures against the proposed dam), she had exciting and scary stories to tell of dacoits, crocodiles, tiger pug marks and pachyderms almost mauling her in her little tent at night. Absorbing her tales while massaging her tired feet, I would forget my bottled-up anger over her 'borrowing' my favourite jeans for her trip! She loved the Wynad district and urged, in right earnest, my father to buy some land in the forest.

Viji was a fiery, attractive young woman in her twenties when she had to sort out her inner devils. She sought to throw herself deeper into her work as many of us do. But on the work-front she suffered a crisis of confidence when she felt that others were staking claim to her life's work. She was devastated when she perceived the failure of friends and colleagues to place confidence in her abilities .

All this was just before she left for the US. She wrote several pained and confused letters then and I gleaned that her personal crisis was only worsening there. After one particularly disturbing letter, I made her come home immediately because we wanted her to sort herself out at home first. When I later visited my father's home on holiday, the immensity of Viji's breakdown hit me. I

watched my strong and beautiful sister unravelling into a mass of nerves, virtually turning into a little child. All attempts to comfort her and absorb her pain did not help to exorcise her personal demons. To make matters worse, she perceived rejection from the very people she considered her real family. Sadly, many of them could not comprehend the contours of schizophrenia.

When she described the experience of an ECT prescribed by the rather conservative psychiatrist I could have ripped the man apart, limb to limb. We thanked the powers that be that cerebral lobotomy was an outdated psychiatric practise to treat mental illness by then. Despite taunts, we took the informed decision of getting her out of hospital treatment and involving ourselves actively in her therapy. My father scouted for a progressive psychiatrist and found Dr. Rudran at Schizophrenia Research Foundation. In those terrifying days, if there was an ephemeral glimpse of the Viji of old, it was when she returned from visits to the Crocodile Bank. Strangely enough, just before she was found dead after several weeks of disappearance from home, she seemed to be regaining an iota of her former confidence. She smiled more often. And then she was gone and there were only bones.

Some of her favourite songs were *Yellow Brick Road* by Elton John, *The Logical Song* by Super Tramp and *Vincent* by Don McLean. Her favourite poem was *The Road Less Travelled* by Robert Frost. For us, the news that the forest cane turtle was named after her is a 19 year catharsis, a long frozen denouement, a vindication of a faith kept in Viji's worldview. For Viji, who loved to quote from Frost's '*Stopping by the Woods on a Snowy Evening*', the honour bestowed on her would be a soul-warming homecoming and the final sleep resting on the benediction of promises finally kept.

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Turtles were transported in large numbers from Orissa to West Bengal in the late 1970s

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