



# AFRICAN SEA TURTLE NEWSLETTER

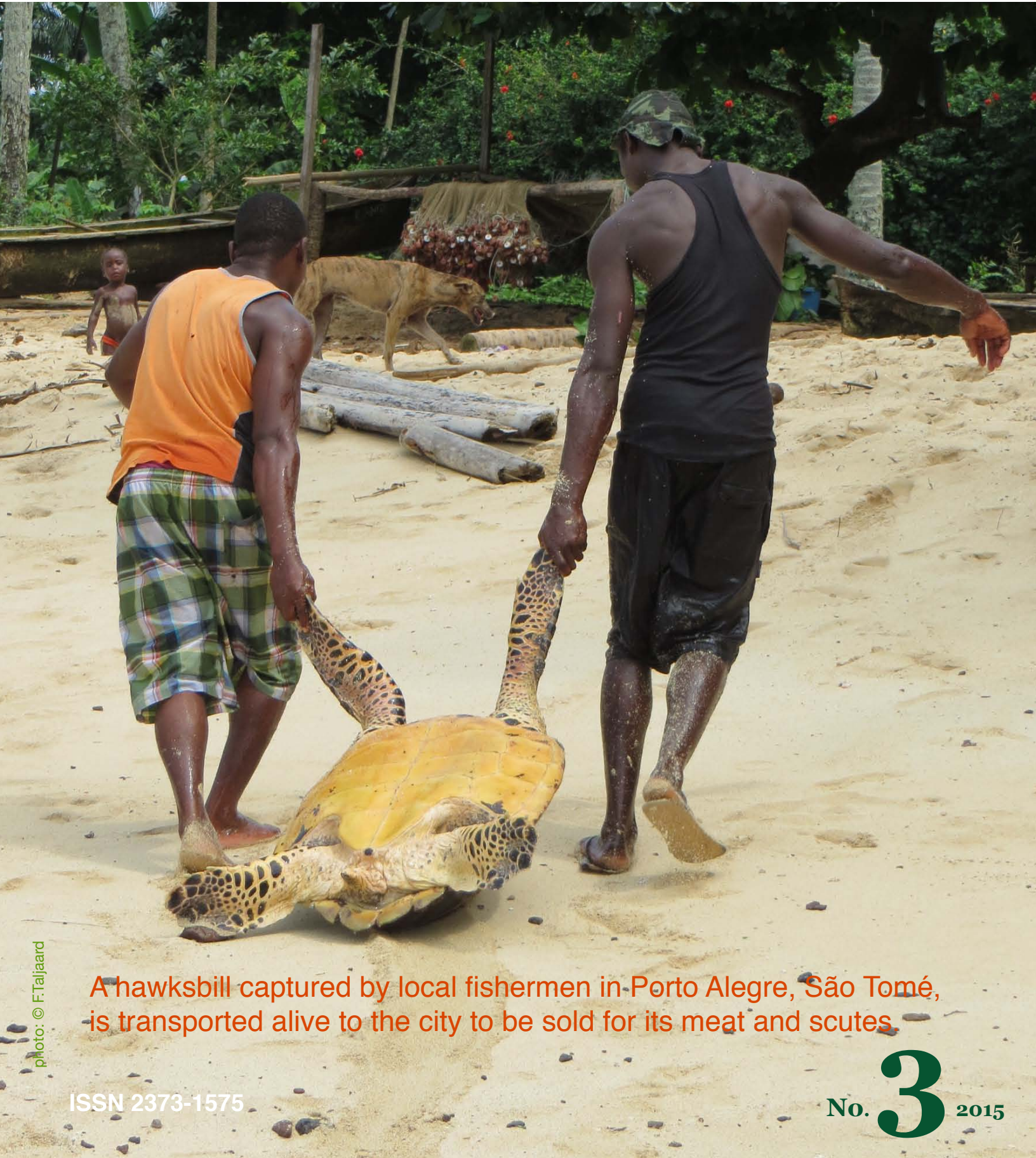


photo: © F.Taljaard

A hawksbill captured by local fishermen in Porto Alegre, São Tomé, is transported alive to the city to be sold for its meat and scutes.

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## Foreword: The African Sea Turtle Newsletter #3

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In 2013 I set out on foot to survey a 50-km long leatherback beach in Sierra Leone with my colleague Edward Aruna and other project members of RAP-SL (Reptile and Amphibian Program-Sierra Leone). We started our walk around 4 pm, slept briefly on the beach from midnight to 5 am and still had about 20 km to go in the mid-day sun, when we met an old lady who was very curious about my presence on the beach. On hearing what I was doing, her comment was, “This woman must have money at home and she is coming to suffer here?!” I could not explain to this old woman that I had cheerfully “come to suffer here,” and that there are many others who voluntarily spend their lives “suffering” on behalf of sea turtles in Africa.

Even women from the local communities are now becoming increasingly involved, sometimes in non-traditional roles, within sea turtle projects. The all-women’s beach patrol team in Congo (Fig. 1), the women beach monitors in Liberia (Fig. 2), and the unique use of women’s traditional clothing in Tanzania to communicate the conservation message (described in this newsletter) show the growing breadth of sea turtle conservation in Africa.

Also, there is so much that remains to be discovered and documented about sea turtles on this continent; in this issue alone, there are two “first observation” reports of loggerheads from Ghana and Togo. So please do continue to share your ideas and observations—with expanding knowledge and creative conservation strategies, we can define and refine our efforts in the region wisely.

With the International Sea Turtle Symposium in Turkey around the corner, we will have another opportunity to talk all things Africa at the Africa Regional Meeting (19 April 2015). We are very pleased to have a new Co-Chair for this meeting, Andrews Agyekumhene, from Ghana—please share your suggestions for discussion topics with him ([andyaohene@yahoo.com](mailto:andyaohene@yahoo.com)). This is an excellent opportunity to network, establish collaborations, share ideas, and to be inspired by the work of our colleagues!



Figure 1. Beach patrollers, Wildlife Conservation Society-Congo (Photo: M. Tiwari).



Figure 2. Beach patrollers, Save My Future Foundation-Liberia (Photo: M. Tiwari).

## GUEST EDITORIAL

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### Impact of the Ebola Virus Disease Outbreak on Conservation Efforts in Sierra Leone

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The sudden outbreak of the Ebola Virus Disease (EVD) in Guinea, Liberia and Sierra Leone has become the most life-threatening issue to West African nations, causing fear and panic amongst its populace. More than 8,000 people including medical doctors and nurses have died since the first case was encountered in March 2014. As there is currently no effective vaccine or cure for the disease, the government of Sierra Leone with the help of international medical teams, is embarked on massive education and sensitization programs, the rapid identification of the sick, removal of the ailing and deceased from homes, and the quarantine of potential areas—including homes where the sick or deceased were removed—and districts indefinitely. Hygiene measures that include the provision of soaps, buckets and chlorine for frequent hand washing, and the ban on public gatherings to prevent transmission of the virus have been put in place. These measures are good for the control of the EVD, but for conservation organizations, the measures are limiting the day-to-day movement of project staff and some other key activities within our areas of work.

For the Reptile and Amphibian Program-Sierra Leone (RAP-SL), the EVD outbreak has impacted our work in the following ways:

1. Ban on public gatherings: The ban on public gatherings all over the country has prevented most of our community meetings. These meetings, in the past, have helped in disseminating education and sensitization messages and the distribution of project materials. Training exercises for project monitors were normally held in such gatherings, but since all form of gatherings are banned except for those on EVD education and sensitization, RAP-SL has not been able to meet with community people in meetings or workshops.
2. Limited access to some communities: Local authorities in some communities have stopped people from visiting their communities except those working on EVD eradication.
3. Increase in cost of materials: The EVD outbreak has caused an increase in the cost of basic commodities, items and services in Sierra Leone today. Businessmen are totally taking advantage of the situation. For environmental NGOs like RAP-SL with limited funds for producing education/sensitization materials and undertaking community development programs, the high cost of materials has resulted in doing less than before.
4. Some locals are becoming poachers: In the absence of project monitors or project activities in some communities, some locals including fishermen are clandestinely killing turtles.

Since the inception of the outbreak, RAP-SL has limited its conservation work to the island communities only, where there are no incidences of the virus. All other field activities including education campaigns and surveys in the other parts of the country have been suspended until

the EVD crisis comes to an end. In order to continue our conservation effort, some of our normal work plans have been adjusted as follows:

1. All community meetings/workshops have been suspended until the public gathering ban is lifted. However, one-to-one discussions are held with key community members on project matters, including gaining access to their communities, plans and progress.
2. For the beach and bycatch training exercise, project monitors will not be gathered in one place for the training, but what we plan to do is to take all potential monitors in a community to the beach and discuss matters while walking the beach they will be monitoring.
3. Some community development efforts are still in progress; rolls of fishing threads have been secured and sent to some key communities to be given out to those fishers who bring back turtles entangled in their nets ashore alive.
4. For the production of education and sensitization materials, even though printing costs are high, RAP-SL was able to print a small number of copies of calendars, billboards, brochures, the fisheries bill, and t-shirts.
5. Under the UNDP/GEF Small Grant Program, RAP-SL was able to secure 4 all-in-one desktop computers, two printers and solar electricity for two primary schools and the eco-lodge in the Turtle islands. The solar panels have been, but the delivery of the computers, printers, books, pens and pencils are waiting for the reopening of schools and the lifting of the ban on public gathering so that a hand-over meeting can be conducted.
6. Nurseries have been established to raise seedlings of indigenous trees that will be planted in collaboration with the island students along nesting beaches.

Overall, EVD's impact on our daily lives is tremendous, as majority of Sierra Leoneans have lost their jobs or are being paid half salaries only for a limited time period; if Ebola extends beyond the designated time period, no salaries will be paid. Prices of some food items have gone up; bush meat is no more an alternative source of proteins for many homes, as people are told that bush meat processing is a possible source of contracting Ebola. Vegetables and other food items from affected districts are rejected because of the fear that they might have been infested unintentionally with the virus through droppings of infected animals or otherwise.

The poor medical facilities, understaff hospitals, cost of medicines and fear of going to hospitals are also negatively impacting lives. Even the project staff is scared of moving around and lodging in some communities for fear that should there be any EVD case, the community members would likely cast the blame on visiting project staff.

My vision for the present situation is to see a country, having suffered in the hands of EVD outbreak, recover with good medical facilities and hygiene practices and intense conservation efforts.



## Sea Turtle Strandings between Dakar and Saint Louis, Senegal: Witnesses of a Sad Reality

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During the month of June 2014, hundreds of stranded cetaceans and sea turtles were found in Mauritania on a routine quarterly sampling survey organized, since 2012, by the Program Biodiversity, Oil and Gas (BGP), in the framework of an integrated coastal and marine environmental monitoring scheme. To investigate whether an extension of that mortality would continue along the Senegalese coast, IUCN Senegal and the Coordination and Implementation Unit of the PRCM (Regional Partnership for Coastal and Marine Conservation in Western Africa) responded favorably to a request to fund a field trip from Dakar to Saint Louis, Senegal, by a team of experts.

The survey took place from 22 to 25 July 2014 and was executed by Drs. Abdoulaye Djiba, cetacean biologist at IFAN (L'Institut Fondamental d'Afrique Noire), UCAD Dakar, Abdelkader Diagne, Head of Collections, African Chelonian Institute (ACI), Rufisque, and Wim C. Mullié, toxicologist/ornithologist, environmentalist, head of monitoring of marine vertebrate strandings for BGP. The latter was also leading the survey.

The purpose of the survey was to make an inventory and to document vertebrate strandings: species concerned and the causes of their death; their geographical position; biometrics and sex of individuals encountered; collection of tissue samples and bone for genetic studies (DNA analysis) and the collection of biological material



(whole or partial skeletons) for the scientific collections at IFAN and ACI.

Senegalese beaches are not only used by fishermen but also by coastal populations to transport people and goods, especially vegetables from production areas in the Niayes, and for recreation. This is different from the situation in Mauritania where beach use is limited to fishmongers and fishermen while recreational use is still rudimentary, except during weekends in Nouakchott or elsewhere for sport fishing, although this is still very limited. This difference may result in

more frequent removal of fresh carcasses in Senegal to serve as “marine bush meat”, or by trophy hunters (skulls, teeth, carapaces). The survey was done by a four-wheel drive vehicle at low speed (30-35 km/h) on the lower beach during receding tide. However, this procedure does not allow observing the high tide lines at the higher parts of the beach, where bones and other remains were often deposited during previous spring tides. To fill the void, at three different localities (two at Lompoul sur Mer and one on the Langue de Barbarie), foot surveys were carried out, simultaneously over 15 km in total by two people. The results of these additional counts will be used to calculate correction factors for counts obtained from the vehicle.

A total of 36 sea turtles were found during the survey, but the total number estimated with the correction factor indicates that 47 individuals had stranded. Four species were identified, including 17 green turtles, *Chelonia mydas*, 10 loggerheads, *Caretta caretta*, four olive ridleys, *Lepidochelys olivacea*, and five leatherbacks, *Dermochelys coriacea*. The remains of six other individuals, represented by one or more bones, could not be identified. The vast majority of individuals found were adults, some with signs of human impact (slaughtered, butchered, shell removed).

Leatherback turtle strandings are rarely recorded in Senegal. Exceptional leatherback turtle strandings were also reported from Mauritania one month earlier and it was suspected that this species came to the coast in the wake of a bloom of the jellyfish, *Chrysaora fulgida* (Reynaud, 1830), along the Mauritanian coast. Very few jellyfish were observed during the survey, consistent with observations in Mauritania south of Chott Boul till the Senegalese border where equally few jellyfish were observed.

The loggerhead and particularly the green turtles are known as species nesting on



Senegalese beaches. However, their breeding season is mainly during the rainy season and no signs of reproduction were obtained during the survey.

The causes of death are often difficult to determine without detailed necropsy, but several individuals found showed signs of human consumption. The shell of a leatherback turtle was removed, probably for collection. All these individuals were probably victims of fisheries bycatch. The owner of a Yoff based pirogue, fishing with purse seines off West Africa, told us that captures up to 15 turtles during a fishing trip frequently occurs. As these are well appreciated by consumers, they are then unloaded and sold in the fishing ports where boats landed, whereas cetaceans were said to be thrown overboard.

In addition to sea turtles, a total of 26 cetacean strandings were also counted.

Although there is no national monitoring network for strandings in either Senegal or Mauritania, the quarterly monitoring performed by the BGP Program in Mauritania since 2012 and opportunistically



by COREWAM on Senegal's beaches since 1988 has already proved useful in biodiversity assessment of cetaceans and sea turtles and was also able to detect an unusual mortality event (UME) of harbor porpoises.

Periodic and systematic monitoring of beaches is rather inexpensive and relatively easy to organize, as compared to aerial surveys or monitoring by ships. It is strongly recommended as a means to assess temporal trends of biodiversity of cetaceans and marine turtles, to detect any UMEs, and to estimate the (increase in) impacts of human activities, including fisheries, marine transportation, and offshore oil and gas exploitation in Senegalese waters. A better control and application of existing regulations, national laws and international

conventions regarding sea turtles and cetaceans is much desired. Establishing a dialogue with fishermen and their organizations is also recommended to limit bycatch of cetaceans and sea turtles, currently considered as the main cause of their deaths, which is also part of the PRCM strategy.

*For more information, please contact the authors.*

*Photo credits: Wim C. Mullié. Use only with permission.*

*Species identifications verified by Drs. Koen van Waerebeek (cetaceans) and Jacques Fretey (turtles).*



## Loggerhead Conservation in Santa Luzia Island, Cabo Verde: A Partnership with the Sea Shepherd Conservation Society

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The island of Santa Luzia, together with its neighboring smaller islands (Raso and Branco) and adjacent seas is a major Marine Reserve in the archipelago of Cabo Verde (Fig.1). Due to the lack of fresh water, today only fishermen, scientists and passing boats stop here to appreciate and unravel the mysteries hiding in the only uninhabited island in the country.



Figure 1. Location of the Marine Reserve of Santa Luzia, Branco and Raso in the Cabo Verde Archipelago (Source: Analysis of Institutions and Fisheries Policies in Cabo Verde 2011).

Until very recently, the Reserve was classified as “integral” and was only open for scientific purposes. However, the traditional fishermen from the neighboring islands, Santo Antão, São Vicente and São Nicolau, ignored this law and continued fishing in the Reserve. Given the importance of this fishing spot for the development of the country, the government changed the classification of the Reserve from “integral” to “Partial Nature Reserve” on 17 October 2014.

The presence of the fishermen, occasional visitors and isolation made the NGO Biosfera1 feel the need in 2011 to maintain a campsite on the island to protect and monitor the loggerheads, *Caretta caretta*, because human exploitation is considered the main threat to sea turtles in Cabo Verde. Loggerheads are the most common sea turtles nesting in the Cabo Verde archipelago. In fact, the Cabo Verde islands represent the third most important nesting site in the world, and the most important rookery in Africa for this species (Marco *et al.* 2011). Since then, the project continues year after year with many national and international partners and funders such as: Director General of the Environment- Cabo Verde, Rufford Small Grants Foundation, and Critical Ecosystem Partnership Fund among others.

In 2014, Biosfera 1 established a new partnership with the Sea Shepherd Conservation Society. This nonprofit organization, established in 1977, is focused on marine wildlife conservation and uses direct-action tactics to intervene in illegal poaching activities, most notably Japanese whaling in the Southern Ocean whale sanctuary. Quite by chance, this organization arrived in Cabo Verde to make contacts with local NGOs in order to learn about the level of environmental protection in the country. Jairo Mora Sandoval, a ship named in honor of the Costa Rican volunteer who was murdered while patrolling the beaches to protect sea turtles in Costa Rica, anchored in the harbor “Porto Grande”, Mindelo, São

Vicente Island, where Biosfera 1 has its headquarters. Many meetings with the Sea Shepherd Conservation Society resulted in an advantageous partnership for Biosfera and for Cabo Verde in general. During the sea turtle nesting season in Santa Luzia, Sea Shepherd provided logistical, financial and volunteer aid without which it would



Biosfera and Sea Shepherd teams on Santa Luzia (Photo: S. Ager)

have been almost impossible to carry out the protection and beach monitoring campaign this year.

The camp was set up in Francisca beach at the southern end of Santa Luzia, and every morning two teams patrolled this beach, which is 4 km long, and Achados beach, located in the north, which is almost 3 km long. These are the two main beaches for nesting on the island. During the night, one team collected tissue samples for genetic analyses from nesting turtles. With about 500 nesting females per season Santa Luzia may host more than 1% of the nesting population in the Atlantic (Rendall-Rocha *et al.* 2014, *Unpubl. data*).

On the Sea Shepherd website (<http://www.seashepherd.org/>) one can read more about this organization’s work around the globe. Their experience in Santa Luzia is



Loggerhead heading back to the ocean after nesting (Photo: S. Ager)



Marine biologists Maira and Kenny measure a loggerhead (Photo: S. Ager)

nicely summed up in Simon Ager, a Sea Shepherd veteran volunteer’s comment, *“It is an amazing sight to behold, as a turtle carves out the perfect chamber in which to lay her eggs, going into a trance-like state. Her back flippers gently raise and lower as she drops between eighty to one hundred*

*eggs, each the size of a ping-pong ball, before filling in the nest with sand.”* Biosfera will remain their partner until the end of the year at least. This first partnership is a way for organizations to meet and collaborate, however, Sea Shepherd has shown an interest in helping Cabo Verde in the protection of the oceans and their wildlife in a more committed way.

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## Loggerhead Sea Turtle Nesting Activity in Ghana

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The loggerhead sea turtle, *Caretta caretta*, is well documented in temperate and tropical waters of the Atlantic, Pacific, and Indian Oceans. In the eastern Atlantic, apart from a large nesting population in the Cape Verde archipelago (Marco *et al.* 2012), nesting in the region is not well known or documented (Fretey 2001; Segniabeto *et al.* this issue). Early reports from Ghana indicate that five species of sea turtles (loggerheads, green turtles, *Chelonia mydas*, hawksbills, *Eretmochelys imbricata*, olive ridleys, *Lepidochelys olivacea*, and leatherbacks, *Dermochelys coriacea*) occur in coastal waters, but documentation was limited to anecdotal observations that could not be confirmed. Olive ridleys, greens, and leatherback are known to routinely nest in Ghana, but the current nesting status of loggerhead and hawksbill turtles are unknown (Amiteye, 200; Agyekumhene, 2009).

We report the observation of a nesting loggerhead sea turtle at approximately 22:30 hours on 31 December 2012 in Pram Pram, Ghana (5.7169°N, 0.1001°E). The observation was made by the authors and a group of visitors during a sea turtle nest walk led by P. Allman. The turtle was found while digging an egg chamber and was further observed to deposit eggs before camouflaging and returning to the sea. The turtle was not tagged and morphometrics were not collected due to restrictions associated with permits and equipment. The animal was identified as a loggerhead based on the following characteristics: presence of five costal scutes, carapace length noticeably longer than carapace width, enlarged head with rusty-brown coloration.

The nest was not marked nor observed again as the location was over 100 km east of the authors' primary study site. This observation provides the first documentation of a nesting loggerhead sea turtle in Ghana, and perhaps in the entire Gulf of Guinea.



Recent conversations with individuals in five fishing communities throughout Ghana have suggested this species is occasionally observed on fishing vessels (Alexander *et al.* 2012). Many individuals recognize photographs of the species and comment on the enlarged head compared to that of the more commonly observed olive ridley sea turtle. More recently, Tanner (2014) reported that loggerhead turtles were captured during a short-term fisher bycatch study in the western region of Ghana. The growing

number of reports indicating the presence of loggerheads in the area highlights the need for resources and additional surveys before we can fully describe the presence and status of sea turtles in the region.

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*Photo credits: D.Barbour*



## First Observation of a Loggerhead, *Caretta caretta*, in Togo, West Africa

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For the first time in the study of sea turtles along the coast of Togo, a loggerhead, *Caretta caretta*, is reported. An adult female of this species was accidentally captured in a beach seine in Lomé, opposite the Santa Maria on 4 July 2014 (Fig. 1). It was examined and photographed by the NGO Agbo-Zegue's team before being released into the sea. The total curved carapace length was 71 cm and the total curved carapace width was 69 cm. The head width was 15 cm. The left front flipper of the animal was cut at the level of the shoulder. This would probably have occurred a long time ago as the wounds had healed and did not prevent the individual from returning to the sea when left on the beach. The animal was found to be healthy.



Figure 1. Female loggerhead captured in Lomé (Photo: G. Segniagbeto).

This species is rarely found in the Gulf of Benin, and more commonly in the Gulf of Guinea. Brongersma (1941) reported a loggerhead hatchling from Liberia, but then modified the identification to an olive ridley,

*Lepidochelys olivacea* (Brongersma 1982). The species is reported from San Pedro, Ivory Coast, but no specific details are provided by Loveridge and Williams (1957). Toth and Toth (1974) reported 6 loggerhead shells in Ghana, but they may have been olive ridley carapaces misidentified. More recently, Tanner (2014) reported the capture of seven loggerheads in Ghana with an average curved carapace length of  $68.6 \pm 7.2$  cm; these data were collected by local fishermen. Misidentification of the species has also been noted in Cameroon by Tornier (1902) and Nieden (1910). The carapace of a loggerhead, captured at sea, was sold by a local fisherman in Kribi, Cameroon, in the late 1990s.

According to information gathered in Equatorial Guinea, turtles with a big head were caught between Cabo San Juan and Pume. Some fishermen say they nest on beaches in this area (Fretey 1998). Graff and Ballesta (1995) write that the loggerhead is known on the island of Bioko, but Tomás (1998) writes: "Además, se apunta la posibilidad de que otra especie, la Tortuga boba (*Caretta caretta*) es presente en estas aguas, aunque la información que se tiene al respecto es dudosa, ya que pueden producirse confusiones entre individuos subadultos de dicha especie e individuos adultos de *L. olivacea*." ("Furthermore, the possibility that another species, the loggerhead turtle (*Caretta caretta*) is present in these waters is indicated, although the information is dubious, since confusion may occur between subadult individuals of that species and adults of *L. olivacea*."). However, several observational data of adult

males and females loggerhead were noted in reports around the island of Sao Tome (Graff 1995; Dontaine and Neves, 1998; Dontaine and Neves, 1999), but with no evidence of nesting on this island.

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## Sea Turtles Still Nest in Lagos, Southwestern Nigeria

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**Introduction:** Nigeria is a maritime nation located within the Guinean Current Marine Ecosystem of West Africa. The country encompasses 853 km of shoreline extending through eight coastal states. The diverse marine biodiversity includes plankton, benthos communities, fish, turtles, and marine mammals. Nigeria was listed on the UK government website as an illegal CITES trade hotspot.

Sea turtles have historically not been target species, however, declining success in fisheries has resulted in increased by-catch and deliberate captures in commercial and artisanal fisheries. Other important threats to sea turtles in Nigeria include the direct take of eggs and nesting females (Amadi, 1991), pollution (i.e. litter, oil, and sewage), and the destruction of nesting and foraging habitats.

Nigeria uses Turtle Excluder Devices in the industrial shrimp trawl fisheries, but threats still exist within artisanal fisheries. Solarin *et*

*al.* (2009) reported that five to 25 sea turtles are captured per year per canoe. This by-catch comprises of all five species known to nest in Nigeria: loggerheads (*Caretta caretta*), green turtles (*Chelonia mydas*), hawksbills (*Eretmochelys imbricata*), olive ridleys (*Lepidochelys olivacea*), and leatherbacks (*Dermochelys coriacea*).

Sea turtles are known to nest on several beaches along the Nigerian coastline. Sea turtles are recognized as an essential part of the natural heritage in Akassa, Nigeria where

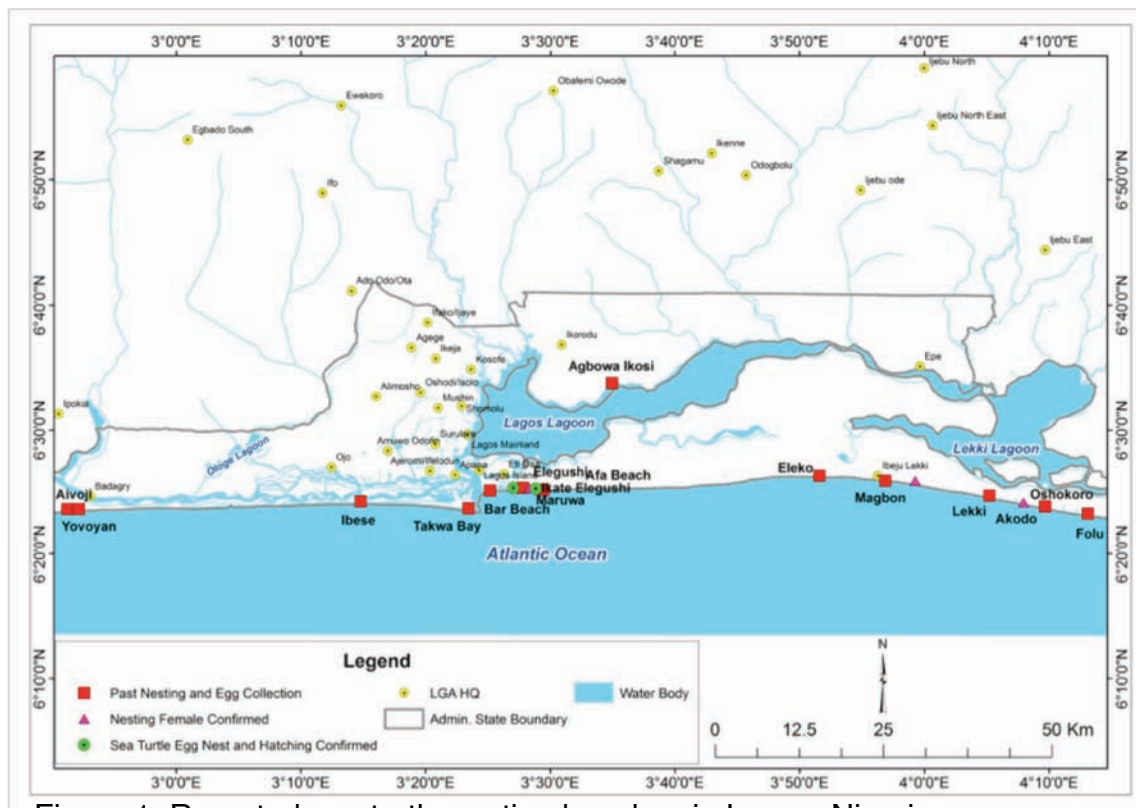


Figure 1. Reported sea turtle nesting beaches in Lagos, Nigeria.

most nests are protected and live stranded turtles are released (Formia *et al.* 2003). Awobamise (*pers. comm.*) reported sea turtle nesting in the dry season between July and March along the Niger Delta area. According to fishermen and coastal community members, sea turtles nest year round on the beaches around Lagos. Although several publications describe sea turtle nesting throughout the Gulf of Guinea, there is little information reported on the sea turtle nesting activity in Nigeria (Amadi 1991; Formia *et al.* 2003; Solarin *et al.* 2009; Adegbile *et al.* 2013). This present study reports on recent nesting on some beaches in Lagos (the most populous port city in Nigeria and Africa). The specific objectives of this study are: (1) to obtain historical information on sea turtle nesting in Lagos and (2) determine present status of sea turtle nesting in Lagos.

**Methods:** Data stored in the Library of the Nigerian Institute for Oceanography and Marine Research (NIOMR) was reviewed to obtain historical sea turtle nesting information. Both off-line and on-line sources of information were utilized to extract historical nesting activity in Lagos. Interviews were also conducted with Research Scientists within NIOMR who had been involved with artisanal fisheries surveys from 1978 to 2000.

Field surveys were organized in the following communities: Onijegi, Marwa, Elegushi, Akodo, and Orimedu. Ten interviews per community were conducted with community fishers and dwellers using a structured questionnaire that explored sea turtle history and nesting ecology. The communities were sensitized about sea turtles by providing them informative sea turtle calendars. Reconnaissance surveys and advocacy visits were made to stakeholders in each community. Two people per community were selected to serve as key informants to the NIOMR.

NIOMR scientists documented sea turtle nesting events through phone calls or visits. Species identification and morphometric



Figure 2. Evidence of sea turtle activity in Marwa, Nigeria.

measurements were recorded using methods of Pritchard and Mortimer(1999). Sea turtle nesting tracks were identified using field guides. Where possible, sea turtles were rescued from fishers by negotiating and paying a compensation for the animal. All animals were released by placing the turtle in a seaward orientation and then allowing it to crawl back to the sea without interference.

**Results:** Desk reviews at NIOMR provided little information as nesting data from Lagos were sparse. Interviews with scientists from NIOMR revealed that sea turtles nested on several beaches in Lagos within the period of 1980-2000. These areas include Ibeche, Aivoji, and Badagry on the western flank of Lagos, and Victoria Island Beach, Kuramo, Akodo, Orimedu, Osoroko, and Folu in eastern Lagos (Fig. 1.). The species reported to nest in Lagos included leatherbacks, greens, hawksbills, and olive ridleys (Fig. 2.). However, most of the respondents could not provide documentation to support their claim

since their research focused on a fish stock assessment for the commercial fishing industry.

Table 1. Sea turtle activity observed within five communities in Lagos, Nigeria.

Beach	Activity
Onijegi	Olive ridleys and leatherbacks nested during the 2010-2012 dry seasons
Orimedu	Olive ridleys and leatherbacks nested during the 2010-2012 dry seasons
Marwa	Eggs (Olive ridley) were collected and olive ridley crawl marks were found during the 2010 dry season
Elegushi	Olive ridley nests were identified during the 2012 and 2013 dry seasons
Akodo	The community roasted sea turtle eggs (unidentified) during the rainy season of 2012

Ninety percent (n=45) of the respondents indicated they have collected sea turtle eggs at some time in the past. Furthermore, 98% (n=49) confirmed they had eaten sea turtle eggs, most commonly after being roasted. Ninety percent (n=45) of the participants agreed that sea turtle nesting is facing serious threats.



Figure 3. Rescued olive ridley rehabilitated in NIOMR plastic tanks before release in September 2013.

Observations during field surveys at the pre-selected beaches indicated that sea turtles are nesting mainly during the dry season (Table 1). Olive ridley turtles are the most frequently observed sea turtles within the study area (straight carapace length above 69.7 cm) (Figs. 3 & 4). Multiple nest emergencies occurred at Elegushi Beach after education efforts were made. Payments made

to fishermen for rescuing turtles ranged from 2,000 to 10,000 naira (=12 USD to 61 USD).



Figure 4. Olive ridley released at Elegushi Beach by NIOMR sea turtle research team in September 2013.

**Discussion:** There is clear evidence that sea turtles are utilizing Nigeria’s beaches for nesting activities. The olive ridley is the most common nesting species observed followed by the leatherback. Observation of an adult female leatherback and her nest clearly confirms that this critically species still nests along Nigeria’s coastline and supports IUCN’s 2013 Leatherback Red List Assessment report that places Nigeria as one of the countries for this species (Wallace *et al.* 2013). Most nesting activity observed in this study were within eastern Lagos at Victoria Island and Lekki Beaches.

Observations made in Elegushi Beach confirms the suitability of this beach for sea turtle nesting. This recreational beach is privately owned by the Royal Elegushi Family of Lagos. This beach could serve as a site to promote sea turtle based ecotourism, but a beach wall, storm surges, and erosion threaten recreational use of this beach. Future surveys are necessary to monitor the nesting activities of sea turtles here.

We recommend additional nesting surveys along the beaches reported during the peak of nesting season to determine the extent of

activity across all locations. The data should then be presented to the Lagos State Government to help guide private and public developers when choosing sites for estates, ports, and other developments (Fig. 5). Lagos is already undergoing rapid development by public and private sectors so these data are immediately needed.



Figure 5. Construction activities at Elegushi Beach in September 2013.

Communities reported that sensitization has increased the awareness of sea turtles and the conservation of these species. Additional education programs are necessary for increasing sea turtle protection along the coast. Communities around Africa with sea turtle nesting activity are already promoting sea turtle education and ecotourism. These programs should be established in Nigeria to help educate the communities and increase protection for these animals.

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**MAURITANIA:** A national sea turtle collection has been established at the aquarium in the Mauritanian Institute of Oceanographic Research and Fisheries (IMROP) in Nouadhibou.



Carapaces were recovered from the villages and added to the collection (Photo: J. Fretey).



An official register of items in the collection has been started. A similar register will be started on cetaceans; a few dolphin and porpoise skulls are seen in the photo (Photo: J. Fretey).



**GUINEA: Kaloe Kure**, a nonprofit organization has been created for the research and conservation of marine turtles in Guinea; this local name signifies hawksbills. This NGO was created with a scientific team from the National Centre for Fisheries Science Boussoura (CNSHB). The president of the organization is Ms. M'Mah Soumah.



Creation of the NGO in a big restaurant in Conakry. (Photo: J. Fretey).



**GUINEA:** A project has been established on the isolated island of Katrack (Marine Protected Area of Tristao Islands and Alcatraz) to monitor green turtle and olive ridley nesting.



Project team on Katrack examining a dead stranded juvenile green turtle. (Photo: M. Soumah).



The project on Katrack includes community aid for the very poor villages of the island. Equipment has already been delivered to the elementary school and the clinic (Photo: J. Fretey).



**GUINEA:** A national sea turtle collection has been established in the laboratories of the Centre National des Sciences Halieutiques de Boussoura (CNSHB) in Conakry.



Jacques Fretey, in the laboratory of CNSHB, recording an olive ridley skull from Katrack Island in the collection (Photo: M. Soumah).



**DR. FEITIOUMATT LEMATT HAMA!**

It is a pleasure to inform everyone that Miss Feitoumatt Lematt Hama has successfully defended her doctoral thesis (with a “very honorable” mention) at the University Abdelmalek of Essaadi Tetouan, Morocco, on 19 January 2015. Her doctoral co-supervisors were Prof. Mustapha Aksissou and Dr. Manjula Tiwari. Dr. Jacques Fretey supervised the fieldwork and data collection in Mauritania. Her thesis is entitled, “Status and Conservation of Sea Turtles in Mauritania”. Despite all the hardships of this project, Lematt completed her project with great perseverance, courage, and determination. Congratulations Lematt.



Photo: J. Fretey





## Sea Turtle Artisans of São Tomé and Príncipe

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**The following speech was given in early 2006 by Carlos Trindade, a turtle artisan (*tartarugueiro*) and at that time the President of the “Tartarugueiros Association São Tomé and Príncipe”, during the International Meeting on Sea Turtles in São Tomé and Príncipe, 30 January—3 February 2006.**

I thank him for sharing with us the interesting point of view of the *tartarugueiros*, including remarks on the sea turtle capture and commercialization process, as well as the suggestion of alternatives to decreasing the non-sustainable use of sea turtles in the country.

What surprises me, when reading it again, is that few things have changed today for the *tartarugueiros*. During recent discussions it became clear that the main obstacle is the demand for tortoiseshell crafts, although they are aware of the significance of conserving sea turtles in the country and what that means for everyone. Hawksbill shell (*Caco*) handicrafts are very valuable, but the *tartarugueiros* declare that they would happily work full time on other materials (e.g. horn, wood or leather) if more orders were made. Above all they are skilled artisans and their work proves it.

At the time the speech was made, it was common to sell turtle jewellery in the street and in shops, mostly to environmentally unaware tourists. Although illegal exportation continues to be the major cause of concern, positive changes have been made in the past few years, especially due to the efforts of some non-governmental organizations (NGO). More recently, and again thanks to NGO efforts, legislation for the protection of sea turtles was approved and published in April 2014, radically prohibiting all types of sea turtle use, except in research. Although public awareness and law enforcement are lacking, we hope the situation will continue to improve, particularly by taking into consideration and involving the people who still make a living from sea turtles.

Below is the English translation of Carlos Trindade’s speech followed by the original speech in Portuguese:

### **Sea Turtles, Tartarugueiros and Sea Turtle Handicrafts**

**Carlos Trindade**

*Tartarugueiros Association of São Tomé and Príncipe*

Ladies and gentlemen, it is with great joy and honour that I participate in this ceremony in the capacity of President of the Tartarugueiros Association of São Tomé and Príncipe. The creation of our NGO is published in the Santomean Republic Gazette dated 3 July 2000, where the fundamentals of the organization are described. Our objective is to defend the economic interests of the way of life of the *tartarugueiros* (turtle artisans); when the turtle crafting was practiced freely we all lived well.

In São Tomé and Príncipe turtles used to be captured primarily as food (e.g., *estufado*, *calulú*, *blá-blá*, *izaquente de azeite*, *canfa*). Their meat is tasty and healthy in the plates of Santomeans of all races and origins. The turtle shells or carapaces are used to produce beautiful handicrafts both for the rich and for the poor.

With the prohibition on capture, and the decrease of handicraft commercialization, the *tartarugueiros* have been living with great financial difficulties. São Tomé and Príncipe is generally a poor country, with around 42 families whose life is based on artisanal turtle handicraft trade, and who have been living in extreme poverty since the ban on sea turtles.

In my case, I started working with turtle handicraft 20 years ago. At that time I did not have money to buy sea turtles, but I started because a gentlemen left me the raw material, without knowing its value. Once I started working, my business flourished very well, my life was good life, and I was able to support a big family and people in need who came to ask for aid. Currently that does not happen.

**CONVERSION:** The ADOC Commission of the European Development Fund, responsibility of the European Union, convinced us to abandon our profession and then failed to meet in real life their commitments. Today we are not well; we have lost our way of life in a country that lacks employment. They fooled us with an average of 7 million dobras (~350 USD) to each *tartarugueiro*, and based on the instructions from the commission, promised to reward us with a loan that would allow us to develop a new commercial activity, but this never happened.

The planned conversion programs through the project to support the implementation of the International Convention on Endangered Species, to which we gave our support, were:

#### **Area of Conversion, Artisanal Fishing Sector**

Out of 7 *tartarugueiros* only 5 were awarded support of approximately 60%, the other 2 elements received absolutely nothing.

#### **Area of Conversion, Retail Trade and Salesman Sector**

Each one of the 15 *tartarugueiros* in this area was rewarded with 10 rice bags plus one business license with no other support.

#### **Area of Conversion, Professional Training Sector**

The 5 participants received no training because the conditions offered prevented the families from subsisting throughout the training period.

#### **Area of Conversion, Agricultural Sector**

There were 11 *tartarugueiros*, all were left with absolutely nothing. Four of them are of retirement age.

In this context, ladies and gentlemen, I have to inform you that there is no compliance with the agreed memorandum between the Tartarugueiros Association and the European Development Fund. If our leaders cared more, our country would now be gaining a lot from the capital that was given to the protection of sea turtles.

It should be noted that once the capture of turtles was legal worldwide. If today there are those who protect the turtles because they are endangered, then we also have to protect them and we will protect them by helping the *tartarugueiros* with a new conversion, but this time with realistic goals and by monitoring the conversion over time. This plan should be developed with the participation of the *tartarugueiros*, and should not be a decision that comes from above without the agreement of the people involved and affected by the program.

**CAPTURE:** With regards to the capture of turtles, São Tomé and Príncipe has used a primitive but irrational method, that is, we wait on the beach for the turtles to come to nest. When a turtle emerges, at the moment of laying its eggs, we capture it. Many times we do not let the turtle lay her eggs or we take them to eat, while what we should do is protect the eggs to ensure turtles in the future.

Other times, the captures are made with an anchored gillnet (*rede feijão*) placed by fishermen, a traditional gear that captures turtles in their natural habitat, not on land where they are defenceless and laying eggs. The anchored gillnet is about 2 meters high and the length is variable, depending on the investment. The net is deployed in a straight line by fishermen and is secured to the bottom by rocks, as anchors, and to the surface by buoys.



Photo: F. Taljaard

The capture by net and by waiting on the beach are mainly carried out between November and January and only targets adult turtles. Smaller turtles are caught throughout the year by spear fishermen and often by hooks baited with fish or jackfruit. With regards to spearfishing, the turtle is captured with spear guns or by hand.

**COMMERCIALIZATION:** The mechanisms used for the acquisition of raw material are as follows: solidarity among fishermen, *palaiês* (fish sellers) and other *tartarugueiros*. The best option is to escape the *palaiê* and buy directly from fishermen at a cheaper price.

When fishermen are able to bring the turtles directly to the workshop, the expense for the *tartarugueiro* will be less. When, out of necessity, we go to the fisherman ourselves, the expense is higher. Also, to buy directly from the fisherman is best for them because they get a better price than selling to the *palaiês*. This only happens in the case of *Sada* (hawkbill), while the *Ambo* (all others species) does not interest us because the work quality will be lower than with *Sada*.

**FOOD AND CRAFTS:** After capture, the *Ambo* sea turtles serve only as food, while the *Sada*, in addition to its meat, has the advantage of its scutes used for handicrafts. This diet is not traditional; in São Tomé and Príncipe we treat the turtle as regular meat; some people like it and others don't.

After the meat is used for food, the rest of the *Sada* carcass is what *tartarugueiros* use as raw material to make their products, such as earrings, rings, necklaces, glasses frames, caskets, fans. All this valuable jewellery was sought throughout the world from America to Africa through Europe.

This craft trade alone is not a problem for turtles. The big problem is marine pollution, industrial fishing and capturing females and eggs without rules, causing a decrease in turtle numbers.



Photo: R. Ferreira

**CRAFTS IN HORN:** In my particular case, as an alternative to protect sea turtles, I was encouraged by a Portuguese from Santa Casa da Misericórdia (Holy House of Mercy) to change my raw material from turtle scales to bovine horn. I thank this gentleman, called Patrick, for his courage and encouragement to express my turtle craftsmanship in horn.

However, horn is a material difficult to find in São Tomé and Príncipe simply because there are not enough oxen. If we could attract more customers for this type of craft, increasing their trade, it would be possible for us, for example, to import the raw material from countries where there are horns in abundance.

This material is much more difficult to work with than turtle scales, requiring tools and more laborious and expensive methods, and not allowing the manufacture of small and flexible parts with the durability and strength of turtle scales. For these parts, we must incorporate another type of material besides horn or turtle, perhaps metal or others yet to be tested. For example, with fish scales it is possible to make some of

those smaller parts but they probably would not last because of the use for which they were made.



Photo: R. Ferreira



Photo: R. Ferreira

I often used turtles to make rings and the most fragile parts from horn, which was not accepted by the project of the Holy House, and for which I apologize. I was then asked to look for other alternatives to these more fragile parts and it is what I find myself doing.

**ALTERNATIVES:** I think that increasing the horn crafts is a good measure to create alternatives to turtle crafts, but we can never forget that the craft made of turtles is traditional to São Tomé and Príncipe and that we are talking about the survival of many families who depend on it.

In order for horn to replace turtle it is necessary, first of all, to increase the demand for horn crafts in the national and international markets. If we increase the horn demand, more *tartarugueiros* can now learn how to work with it and start gradually to use it more and more.

Another alternative would be to resume the conversion of *tartarugueiros*, that is, to invest in them so that they change their activity. Although it is known that the turtle crafts are far more profitable than any other activity that the *tartarugueiro* is likely to carry out.

For example, in my case the conversion gave me a canoe, thread and hooks, and I got the rest of the necessary equipment to start fishing for tuna and other projects. It turns out that I couldn't start the activity because I lacked the engine, and it is impossible for me to buy one or get a loan with the banking requirements. If I was supported in getting a loan, I could buy the engine and start the activity, which would provide jobs for more people, not just me.

One way to reduce the capture of turtles would be to regulate capture and sale of turtles, prohibiting the capture of females and eggs on the beach, and limiting the number of turtles that each fisherman can catch. But first we have to conduct studies to see how many turtles can be taken.

With regards to handicrafts using the *Sada* carapaces, a management measure would be to limit the number of licenses and regulate the *tartarugueiro* activity. Thus, there would be a control of the turtle craft trade, and the *tartarugueiros* would supervise the activity themselves because they would be protecting their interests.

**CONCLUSION:** They say we are a poor country, but we are not. What we have to do is stop being beggars and work. Note this: São Tomé and Príncipe has no gold, diamonds, uranium, etc., but we are rich, very rich in natural resources.

The association of *tartarugueiros* supports the project for the protection of sea turtles, but there must be seriousness on the part of the institutions dedicated to this. As you know, without a true conversion and the relevant follow-up, it will be difficult to change our activity.

As you know, before no country in the world used to forbid taking turtles or selling artisanal turtle products. So it is arrogant of some countries to prohibit people from using turtle jewellery, especially when someone used their own money to buy something normal and legal. It is neither a drug nor a weapon of mass destruction, but artwork that has existed for a long time and must be valued. Turtles should be protected, but in a rational way, respecting citizens that use the craft for its beauty.

It is true that all marine resources are not found in the seas of all countries equally. Sao Tome and Principe does not manufacture gold or diamond jewellery because we have no gold or diamonds, but we have turtle jewellery because we have several turtle species. In this context we can make good use of our resource in a rational way, even protecting it in a better way, so that in the future we will be able to explore other markets, and São Tomé and Príncipe will come out the winner. If we do not have other profitable resources, why not take advantage of this one?

Note that the turtle craft is our profession; if trade is banned, what will become of us *tartarugueiros* in a country without jobs such as São Tomé and Príncipe? How will we support our children and women? The school life of our children will be compromised.

So put your hands on your conscience and yourself in our place. How would you react in this situation? Ladies and gentlemen ... please respond with a compassionate spirit and not without compassion.

Many Thanks! São Tomé, 24 January 2006

## **Tartarugas, Tartarugueiros e o Artesanato de Tartaruga**

**Carlos Trindade**

*Tartarugueiros Association of São Tomé and Príncipe*

Meus senhores e minhas senhoras é com muito alegria e honra que participo nesta cerimónia na qualidade de presidente da Associação dos Tartarugueiros de São Tomé e Príncipe, a sua criação está publicada no diário da república de S.T.P. datado de 3 de Julho de 2000, onde se rezam os fundamentos da associação. Ela tem como objectivo defender os interesses económicos da vida dos tartarugueiros, pois outrora o artesanato de tartaruga praticava-se liberalmente e pode-se dizer que vivíamos bem.

Em S.T.P. quando se capturava a tartaruga era, em primeiro lugar, como dieta alimentar, tipo: um estofado, calulú, blá-blá, izaquente de azeite, canfa, etc... Esta carne é saborosa e saudável no prato dos saotomenses de raça e naturalidade. As suas cascas ou carcaças é que se utilizam para produzir artesanato de tartaruga que é bonito, tanto para os ricos como para os pobres.

Com a interdição da captura das tartarugas e da diminuição do comércio de artesanato, os tartarugueiros têm vivido com grandes dificuldades financeiras. São Tomé e Príncipe já é um país de características pobres, com cerca de 42 famílias que vivem à base do comércio artesanal de tartaruga e que desde então têm vivido numa extrema pobreza.

No meu caso comecei a trabalhar no artesanato de tartaruga à cerca de 20 anos, nessa altura não tinha dinheiro para comprar tartarugas e comecei porque um senhor me deixou a matéria prima sem saber o valor que tinha. Comecei a trabalhar e o meu negócio floresceu muito bem, tendo uma vida boa que me permitiu sustentar uma grande família e pessoas necessitadas que me vinham pedir auxílio. O que presentemente não acontece.

**A RECONVERSÃO:** A comissão ADOC do Fundo Europeu para o Desenvolvimento (FED), da responsabilidade da comissão europeia, convenceu-nos a abandonar a nossa profissão, e por não cumprirmos na vida real os seus compromissos, hoje estamos mal, perdemos o nosso modo de vida, especialmente num país como o nosso que carece de emprego. Enganaram-nos com uma média de 7 milhões de dobras (~350 usd) a cada tartarugueiro e, segundo as instruções que tínhamos com esta mesma comissão, prometeram-nos brindar com um empréstimo, algo que nos facultaria o desenvolvimento da nossa nova actividade comercial, mas tal não chegou a acontecer.

Os programas de reconversão planeados, dentro do Projecto de Apoio à Implementação das Convenções Internacionais Sobre as Espécies Ameaçadas, e para os quais demos o nosso avale foram:

### ***Área de Reconversão, Sector da Pesca artesanal.***

De 7 tartarugueiros desta área só 5 foram contemplados com um apoio aproximado de 60%, e 2 elementos não foram contemplados com absolutamente nada.

### ***Área de Reconversão, Sector do Comércio Retalhista e Caixeiro-viajante.***

15 tartarugueiros desta área foram contemplados com 10 sacos de arroz para cada um mais um alvará, sem nenhum outro tipo de apoio.

Segundo as instruções que tínhamos com esta comissão, prometeram-nos brindar com um empréstimo, algo que facultaríamos com um desenvolvimento duma nova actividade comercial, embora não tivéssemos experiência na mesma.

### ***Área de Reconversão, Sector de Formação Profissional.***

Foram 5, mas não aceitaram a formação devido a que as condições oferecidas impediam as famílias destes subsistir ao longo do período formativo.

### ***Área de Reconversão, Sector de Agricultura.***

Foram 11, e não foram contemplados com absolutamente nada. Dentro deles 4 são de características de reformados.

Neste contexto tenho a informar aos meus senhores e minhas senhoras que não há o cumprimento do memorando acordado entre a associação dos tartarugueiros e o Fundo Europeu para o Desenvolvimento. Se os nossos dirigentes se preocupassem mais, o nosso país estaria agora a ganhar muito com o capital que foi dado para a protecção das tartarugas marinhas.

É de notar que outrora a captura de tartarugas era legalizada em todo o mundo. Se hoje há quem proteja as tartarugas pelo facto de estarem em vias de extinção então temos de protegê-las e iremos protegê-las ajudando os tartarugueiros para uma nova reconversão. Mas desta vez com metas reais e com acompanhamento da reconversão ao longo do tempo. Este plano deverá ser elaborado com a participação dos tartarugueiros, e não uma decisão que chegue de cima sem o acordo das pessoas envolvidas e afectadas pelo programa.

**Captura:** No que concerne à captura de tartaruga, em São Tomé e Príncipe tem-se usado um tipo primitivo mas irracional, ou seja, paramos na praia à espera que a tartaruga venha desovar. Quando ela sobe e no momento de por os ovos é que a capturamos, muitas vezes não deixando a tartaruga por os ovos ou levando-os para comer, enquanto deveríamos proteger os ovos para garantirmos tartarugas no futuro.

Outras das vezes as capturas são feitas com rede de feijão, colocadas por pescadores, e que muitas das vezes vem vazia, sendo uma arte tradicional que captura as tartarugas nos seu habitat natural, e não em terra quando estão indefesas e a por ovos. A rede de feijão tem cerca de 2 metros de altura e o comprimento é variável, dependendo do investimento. A rede é largada a direito pelos pescadores e fica presa ao fundo por chumbos e à superfície por bóias.

Esta captura por rede e a espera na praia são efectuadas principalmente entre Novembro a Janeiro e só captura tartarugas adultas. As tartarugas mais pequenas são capturadas durante todo o ano pelos submarinos e muitas vezes por anzóis de pesca iscados com Jaca ou peixe. No que concerne aos submarinos a tartaruga é capturada por armas submarinas ou à mão

**Comercialização:** O mecanismo que se usa para a aquisição da matéria-prima é o seguinte: primeiro, uma solidariedade entre os pescadores, palaiês e tartarugueiros. Pela lei da vantagem é fugir da palaiê e comprar directamente aos pescadores. Porque assim fica a um preço mais barato em relação à compra nas mãos das palaiês.

Quando os pescadores têm a possibilidade de trazer as tartarugas directamente à oficina, a despesa para o tartarugueiro será menor. Quando por necessidade nos deslocamos ao pescador a despesa é menor. Também a compra directamente ao pescador é melhor para eles pois o preço que conseguem com os tartarugueiros é mais elevado do que se vendessem

às palaiês. Mas esta situação só acontece no caso da Sada pois a Ambo (todas as outras) não nos interessa pois não se conseguem fazer os trabalhos de qualidade que se fazem com a Sada.

**Alimentação e Artesanato:** Depois desta captura as tartarugas Ambo servem apenas para a dieta alimentar, e a Sada além da carne aproveita-se as escamas para trabalhar-mos o artesanato. Esta dieta alimentar não é tradicional, em São Tomé e Príncipe nós tratamos a tartaruga como uma carne normal, há quem goste e quem não goste.

No que concerne à Sada aproveita-se a carne para dieta alimentar e o resto da carcaça é que os tartarugueiros usam como matéria-prima para se derivar os produtos, tais como: brincos, anéis, colares, armação de óculos, guarda-jóias, leques. Tudo isto jóias de valor que foram procuradas em todo o mundo, desde a América até África, passando pela Europa.

Este comércio de artesanato só por si não constitui um problema para as tartarugas. O grande problema é a poluição marinha, a pesca industrial e a captura sem regras das fêmeas e ovos que causaram o decréscimo do número de tartarugas existentes.

**Artesanato em Corno:** No que concerne ao corno, no meu caso particular, como alternativa para proteger as tartarugas marinhas fui encorajado por um Português da Santa Casa da Mesericórdia para mudar de matéria-prima de escamas de tartaruga para corno de bovino. Este senhor, de nome Patrick, a quem agradeço pela coragem e a insinuação de manifestar a minha habilidade artesanal de tartaruga em corno.

O corno é um material difícil de encontrar em São Tomé pelo simples facto de não haver bois suficientes. Caso conseguíssemos atrair mais clientes para este tipo de artesanato, aumentando o seu comércio, permitir-nos-ia por exemplo importar a matéria-prima de países onde existe corno em abundância.

Este material é bastante mais difícil de trabalhar que tartaruga, exigindo ferramentas e métodos mais trabalhosos e dispendiosos, não permitindo efectuar peças pequenas e flexíveis com a durabilidade e resistência das em escamas de tartaruga. Para estas peças deveremos incorporar um outro tipo de matéria-prima que não corno ou tartaruga, talvez o metal ou outro material que deverá ser testado. Por exemplo em escama de peixe é possível fazer algumas dessas peças mais pequenas mas provavelmente não iriam resistir devido ao uso para que foram confeccionadas.

Muitas vezes eu usei a tartaruga para fazer as argolas e peças mais frágeis do artesanato em corno, o que o não foi aceite pelo projecto da Santa Casa e pelo qual peço desculpa por ter omitido essa situação. Pediram-me então para procurar outras alternativas para essas peças mais frágeis e é o que me encontro a fazer.

**Alternativas:** Penso que o aumento do artesanato de corno é uma boa medida para criar alternativas ao artesanato de tartarugas mas não nos podemos esquecer nunca que o artesanato de tartarugas é tradicional de São Tomé e Príncipe e que estamos a falar da sobrevivência de muitas famílias que dele dependem.

Por exemplo, para o artesanato em corno substituir o artesanato em tartaruga é preciso, primeiro que tudo, que aumente muito a procura das peças em corno no mercado nacional e internacional. Se aumentarmos a procura do corno mais tartarugueiros já podem aprender a trabalhar-lo e começarmos pouco a pouco a utiliza-lo cada vez mais.

Outra alternativa seria a continuação da reconversão dos tartarugueiros, ou seja, investir-se para que eles mudem de actividade. Embora sabendo-se que o artesanato de tartarugas é bastante mais rentável que qualquer outra actividade que o tartarugueiro possa vir a executar.



Por exemplo, no meu caso a reconversão deu-me uma canoa, fios e anzóis, tendo eu conseguido o resto do equipamento necessário para iniciar a pesca ao atum e outros projectos. Acontece que não posso iniciar a actividade porque me falta o motor e é impossível juntar dinheiro para comprar um e não existe a possibilidade de obter um empréstimo de acordo com os requisitos bancários. Caso fosse apoiado para conseguir um empréstimo poderia comprar o motor e iniciar a actividade, o que iria dar emprego a mais pessoas e não só a mim.

Uma alternativa para diminuirmos a captura de tartarugas seria regulamentar a captura e a venda de tartarugas, proibindo a captura das fêmeas e ovos na praia e limitando o número de tartarugas que cada pescador pode apanhar. Mas primeiro teremos de fazer estudos para saber quantas tartarugas se podem apanhar.

Em relação à confecção de artesanato, que apenas utiliza as carcaças das tartaruga Sada, uma medida de gestão seria o de limitar o número de licenças e regulamentar a actividade de tartarugueiro. Deste modo poderia existir um controlo do comércio de artesanato e assim até os próprios tartarugueiros poderiam ser os fiscalizadores dessa actividade pois estariam a zelar pelos seus interesses.

**Conclusão:** Dizem que somos um país pobre, mas não somos. O que temos que ser é deixar-nos de ser pedintes e trabalhar. Reparem só: São Tomé e Príncipe não tem ouro, diamante, urânio, etc, mas somos ricos, muito ricos, em recursos naturais.

De acordo ao projecto da protecção de tartarugas marinhas nós, a associação dos tartarugueiros, apoiamos mas é preciso que haja uma seriedade por parte da instituição vocacionada para isto. Mas como sabem, sem uma verdadeira reconversão e o seu respectivo seguimento, será difícil mudarmos de actividade.

Como sabem em nenhum país do mundo dantes era proibido pegar tartaruga ou comercializar os produtos artesanais de tartaruga, por isso é uma prepotência de alguns países proibir as pessoas de usar jóias de tartaruga, principalmente quando alguém tirou o seu dinheiro e comprou uma coisa normal e legal. Isto não é uma droga nem uma arma de destruição maciça, mas sim artesanato que existe há muito tempo e que deve ser valorizado. Proteger a tartaruga sim, mas de uma maneira razoável e respeitando os cidadãos que utilizam o artesanato pela sua beleza.

É verdade que todos os recursos marinhos não são encontrados nos mares de todos os países de igual forma. Em São Tomé e Príncipe não se fabrica jóia de ouro nem de diamante porque não temos ouro nem diamantes, mas temos jóias de tartaruga porque temos várias espécies de tartaruga. Neste contexto podemos fazer um bom uso de forma razoável, até protegendo-as de melhor forma para que no futuro possamos explorar alguns mercados, ao ponto de São Tomé e Príncipe sair a ganhar. Se não temos outros recursos rentáveis, porque não aproveitarmos este?

É de notar que o artesanato de tartaruga é a nossa profissão, se proibirem desta forma estas comercializações o que será de nós, tartarugueiros, num país sem empregos como São Tomé e Príncipe? Como sustentar as nossas crianças e mulheres? A vida escolar das nossas crianças está comprometida.

Sendo assim, ponham a vossa mão na consciência e ponham-se no nosso lugar. Como reagiriam nessa situação? Minhas senhoras e meus senhores... por favor reajam com um espírito humanitário e não desumanamente.

Muito Obrigado!

São Tomé, 24 de Janeiro de 2006

## Review of Olive Ridley Nesting in São Tomé and Príncipe Islands, West Africa, with a New Nesting Occurrence in Príncipe Island

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The olive ridley, *Lepidochelys olivacea*, is one of the most common and abundant sea turtle species, with an annual, worldwide estimate of 800,000 nesting females (Abreu-Grobois and Plotkin 2008). The majority of nesting occurs along continental margins and rarely on oceanic islands, as this species prefers beaches with high humidity level, which tend to occur near river mouths or estuaries (Casas-Andreu 1978). The knowledge of its distribution and nesting on the Atlantic coast of Africa is still relatively limited (Fretey 2001; Godgenger *et al.* 2009; Maxwell *et al.* 2011; Varo-Cruz *et al.* 2011; Pikesley *et al.* 2013), with a known range from northern Senegal (Fretey *et al.* 2012) to southern Angola (Weir *et al.* 2007), and on the islands of Bioko and São Tomé, in the Gulf of Guinea (Castroviejo *et al.* 1994).

In contrast to other islands such as Bioko, sea turtles on São Tomé and Príncipe nest on suitable beaches all around the islands' perimeters, probably because of the lower human density (Castroviejo *et al.* 1994). The olive ridley is locally known as 'tatô' and has been reported only on some beaches in São Tomé, and in the nearshore waters of both islands (Graff 1996; Fretey 2001; Fretey *et al.* 2005). In Príncipe, an "unusual" sea turtle, whose description fits well with this species, was captured ashore entangled in a piece of net in 1991. However, to date, there was no known or confirmed nesting by the species on this island.

The lack of data and trends on specific nesting beaches make it difficult to assess

nesting populations. At present, the species is categorized as vulnerable on the IUCN Red List (IUCN 2014); recently, regional management units have been identified and suggested as a conservation tool for sea turtle populations, but only 16% of the RMU's have putative delineations (Wallace *et al.* 2010). Hence, there is a need to increase our knowledge of the species distribution and status in the region.

**Study area:** São Tomé and Príncipe is an archipelago located in the Gulf of Guinea, off the west coast of Africa, which consists of two main islands that are 140 km apart and approximately 240 km from Gabon. The islands vary in terrestrial area, with São Tomé being considerably larger, and both islands totalling 964 km<sup>2</sup> in land area. Both islands have a volcanic origin, and are characterized by high volcanic mountains, rough topography, and a tropical hot and humid climate, with a wide range of microclimates. Prevailing winds blow from the southwest and are intercepted by the mountains, leading to abundant annual rainfall in the south of each island. On the other hand, the north of São Tomé receives less than 760 mm, and even less during the months of the "gravana", or the dry season, that runs from October to May each year. Most of the vegetation covering the coastal areas of both islands is tropical rainforest, with a gradual transition from lowland forest to mist forest, and savannah vegetation bordering most of the beaches on São Tomé's north coast. With a total of 209 km of coastline, both islands are rich in

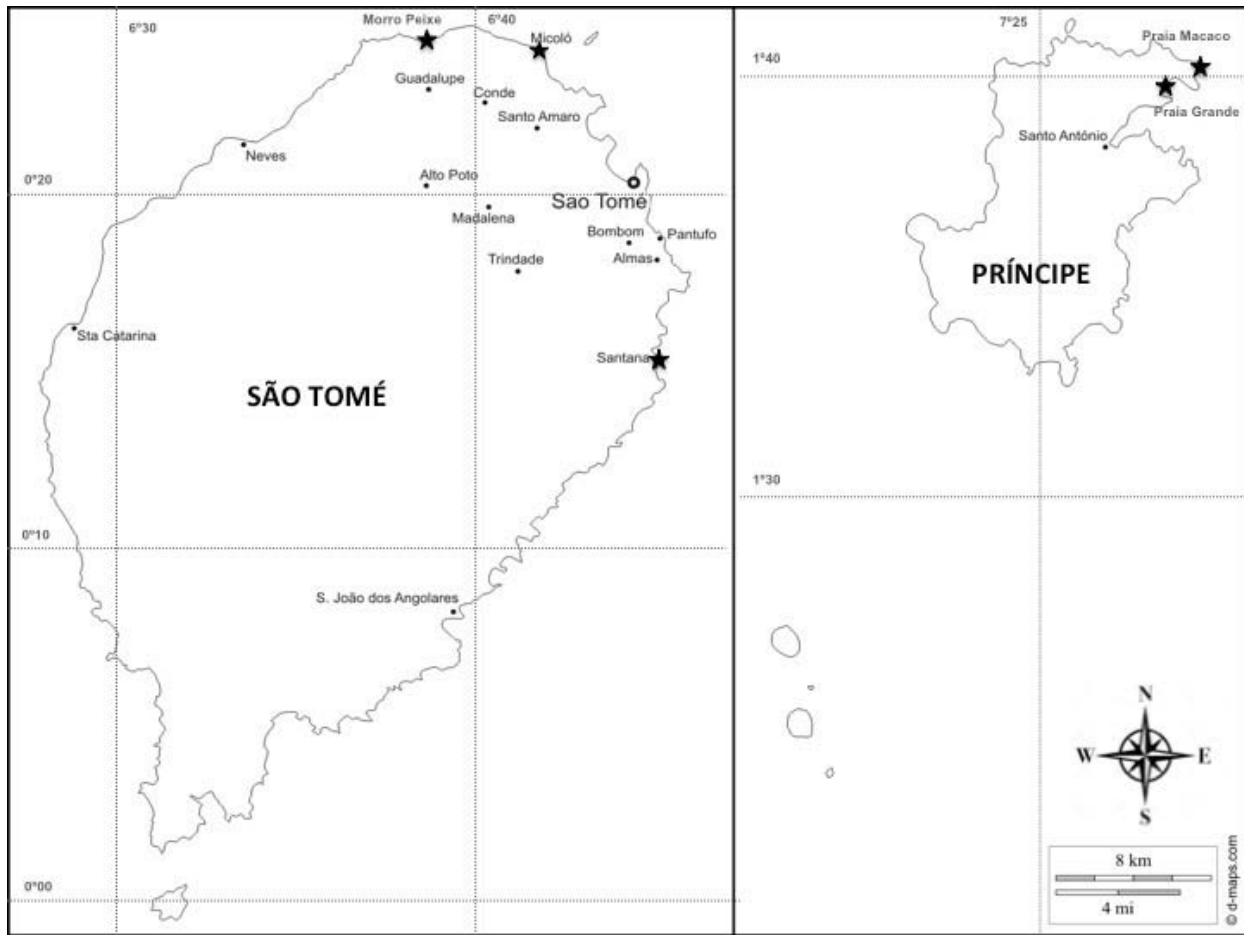


Figure 1. Locations of the main olive ridley nesting sites on São Tomé and Príncipe as indicated by stars (Morro Peixe includes Tamarindos and Governador; Micoló includes Fernão Dias, Micoló and Tartaruga; Santana includes Messias Alves).

beaches, which vary extensively in grain type, size and colour, as well as topography.

**Methodology:** Since 2012, nightly surveys have been conducted on the main nesting beaches of both islands, between October 1 and March 31, with a monitoring effort ranging from 4 to 8 h each night (São Tomé and Príncipe, respectively). These included all the beaches located between Morro Peixe and Micoló, in the north, and Jalé in the south of São Tomé, and Praia Grande in Príncipe. On the remaining beaches, track counts were recorded at least three times each week during the same period (Fig. 1).

**Results—São Tomé Island:** Nesting of olive ridley turtles on São Tomé is strongly concentrated on the northern coast, between Tamarindos and Micoló, with 84.4% of all recorded activity between 2012 and 2014

(Table 1). The nesting season usually starts as early as August and extends through February each year, with a peak in December and January.

Table 1. Olive ridley nesting distribution on São Tomé, 2012-2014 (*Source:* MARAPA’s data used for both seasons).

Beach	Area Monitored (km)	2012-2013		2013-2014		Total Activities (2012-2014)
		False Crawls (n)	Nests (n)	False Crawls (n)	Nests (n)	
Governador	0.6	49	33	17	21	120
Fernão Dias	1.8	9	13	0	1	23
Tamarindos	1.2	5	67	0	0	72
Micoló	2	20	55	4	10	89
Tartaruga	0.6	5	27	3	11	46
Messias Alves	0.8	48	1	19	42	110
<b>Total</b>	<b>7</b>	<b>136</b>	<b>196</b>	<b>43</b>	<b>85</b>	<b>460</b>

Estimating the number of females that sought the beaches of São Tomé and Príncipe during the study period is difficult



Figure 2. Two of the live olive ridley sea turtle hatchlings found in a nest on Príncipe Island, February 2013.

due to the low observation rate (only 25% of all nesting turtles were directly observed), which coupled with the very high mortality recorded, makes any estimates of clutch frequency for this population inaccurate. However, using a standard clutch frequency of 2.5 nests/season/female, and a 2-year remigration interval (Abreu-Grobois and Plotkin 2008), we estimate a minimum population of 147 nesting females during the study period.

**Príncipe Island:** Improved monitoring of the nesting beaches of Príncipe since 2012/13, with the start of a new project, resulted in more regular and accurate surveys around the island. On the morning of 5 December 2012, a nest on Praia Macaco (1°40'51.31"N; 7°27'20.41"E; Fig. 1) was marked and recorded by the monitoring team as a hawksbill sea turtle, *Eretmochelys imbricata*, nest. This judgement was made based on the type of tracks on the sand (asymmetrical), the shallow bodypit and short nest depth (48 cm). The information was corrected during the excavation of the nest after 60 days of incubation (hatching date was not recorded), after counting the lateral scutes of hatchlings and embryos found inside the nest (3 live, 8 dead, and 5 late stage embryos), which had a 5-6 scute

arrangement (Fig. 2). The nest contained in total 115 eggs, of which 105 hatched.

**Discussion:** As with other sea turtle species, nest site selection has an important role in the reproduction of the olive ridley turtle, since conditions inside the nest directly affect incubation period, embryo development (Ackerman 1997), survival of hatchlings, hatchling size (Packard and Packard 1994) and sex determination.

On both islands, there are suitable beaches for sea turtles all around the coast, evidenced by the regular nesting of four different species. However, it is possible that characteristics, such as grain size, salinity, and water tables may be affecting their distribution, particularly of the olive ridley turtle, whose nesting seems to be limited to the northern end of São Tomé Island. On Príncipe, the short and steep, coarse sandy beaches bordered by lush vegetation, preferred by green turtles, *Chelonia mydas*, and hawksbills, might be unsuitable for olive ridleys, who prefer smooth-sloped sandy beaches. Therefore, we believe that this was an isolated event. But we do not exclude the possibility of olive ridley tracks being confused with hawksbill turtle tracks by more inexperienced beach monitors.

However, recent observations of olive ridley and green turtles nesting on nesting beaches where the species had not previously been recorded (e.g. Sal islands, in Cape Verde, Cozens *et al.* 2013) show the plasticity of these species in choosing their nesting site, despite different beach characteristics. Whether these are isolated events or evidence of the expansion of the species' range, the decision will have to wait for confirmation in the years to come.

**Conclusion:** The main cause of the historical, worldwide decline of the olive ridley sea turtle is long-term collection of eggs, and killing of adults on nesting beaches and fisheries bycatch, especially true for the São Tomé and Príncipe Archipelago. This reflects the situation along

the entire west coast of Africa, where nesting olive ridleys are captured and sold in local and regional markets, with a potentially devastating impact to the entire Eastern Atlantic population (Formia *et al.* 2003; Plotkin 2007). Improved monitoring techniques and data collection protocols are essential to understand the current status of this species in the region.

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## Sea Turtle Khangas: Communicating Sea Turtle Conservation Messages in a Uniquely Female Way

Lindsey West

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In Tanzania, women are taking a greater role in fisheries management in addition to their more traditional roles such as fish processing and marketing. The increasing participation of women in the fisheries sector presents an invaluable opportunity to raise awareness of the impacts of poor fisheries management on sea turtles and their habitats since women are often the primary custodians of natural resources. In view of this, a sea turtle awareness campaign has been launched in Tanzania, with funding from the International Sea Turtle Society media grant, which specifically targets women in coastal communities.

Staff at Sea Sense NGO designed and printed a sea turtle themed “khangas,” which is a traditional garment worn by women in Tanzania for almost every occasion. It is a piece of printed cotton fabric with bold designs and bright colours.



Khangas fulfil many purposes in Tanzania, but are most frequently used as a skirt, a shawl, a head wrap, a towel, a bed sheet or a sling to carry a baby on its mother’s back. A message in Swahili is always printed along the edge of the khangas, and the message is regarded to be the most important feature of

the garment. The khangas is viewed as a uniquely female form of communication and is a valuable medium for personal political, social and religious expression.



The Sea Sense khangas incorporates a sea turtle design and carries a Swahili message: “Wanawake tuungane kutunza bahari na viumbe vyake,” which translated into English is a call for women to join together to protect the oceans and all life in it.



The khangas have been distributed to women participating in fisheries management in their communities and have been used as prizes during community



activities and challenges on World Sea Turtle Day and World Oceans Day.

improving the livelihoods of their communities.

The Sea Sense khanga is generating a lot of interest and discussion due to its unique design and message. A broad cross section of the community is being reached with the “sea turtle message,” which serves to promote information exchange amongst citizens of fishing communities who have a critical role to play in securing a future for sea turtles in Tanzania. The khanga also promotes women as social actors, and recognises their important role in conserving and protecting marine resources and



*Photo credits: Sea Sense*



## The First Photo-documented Hybrid of a Green Turtle, *Chelonia mydas*, and a Hawksbill Turtle, *Eretmochelys imbricata*, in East Africa

Dennis Anyembe & Casper van de Geer

Local Ocean Trust – Watamu Turtle Watch, Watamu, Kenya  
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Along the Kenyan coast, five species of sea turtles have been recorded (Frazier 1975): green turtle, *Chelonia mydas*, hawksbill, *Eretmochelys imbricata*, olive ridley, *Lepidochelys olivacea*, leatherback, *Dermochelys coriacea*, and the loggerhead, *Caretta caretta*.

Due to their unique ecology and migratory nature, the multitude of threats that sea turtles face have led to drastic global population declines (Mortimer 2002). In Kenya, the loss of turtle nesting sites due to construction of illegal structures on beaches and poaching of sea turtles by artisanal fishermen have contributed greatly to a decline in their population (Wamukoya *et al.* 1997). To reverse this trend, a number of sea turtle conservation organizations were

started along the Kenyan Coast (Okemwa *et al.* 2004).

Watamu Turtle Watch (WTW) was formed in 1997, following years of conservation work by the local residents of Watamu. The main aim of the organization was to help conserve local marine ecosystems in the Watamu Marine National Park, with a focus on nesting and foraging turtles. In 2002, WTW expanded and formed Local Ocean Trust (LOT) to broaden the marine conservation work of WTW both locally and nationally.

In 1998, the Bycatch Release Program (BCRP) was initiated, which works to recover sea turtles that are accidentally captured by artisanal fishermen. Through this program, fishermen are compensated for the time and effort it takes to get a captured turtle to LOT-WTW.

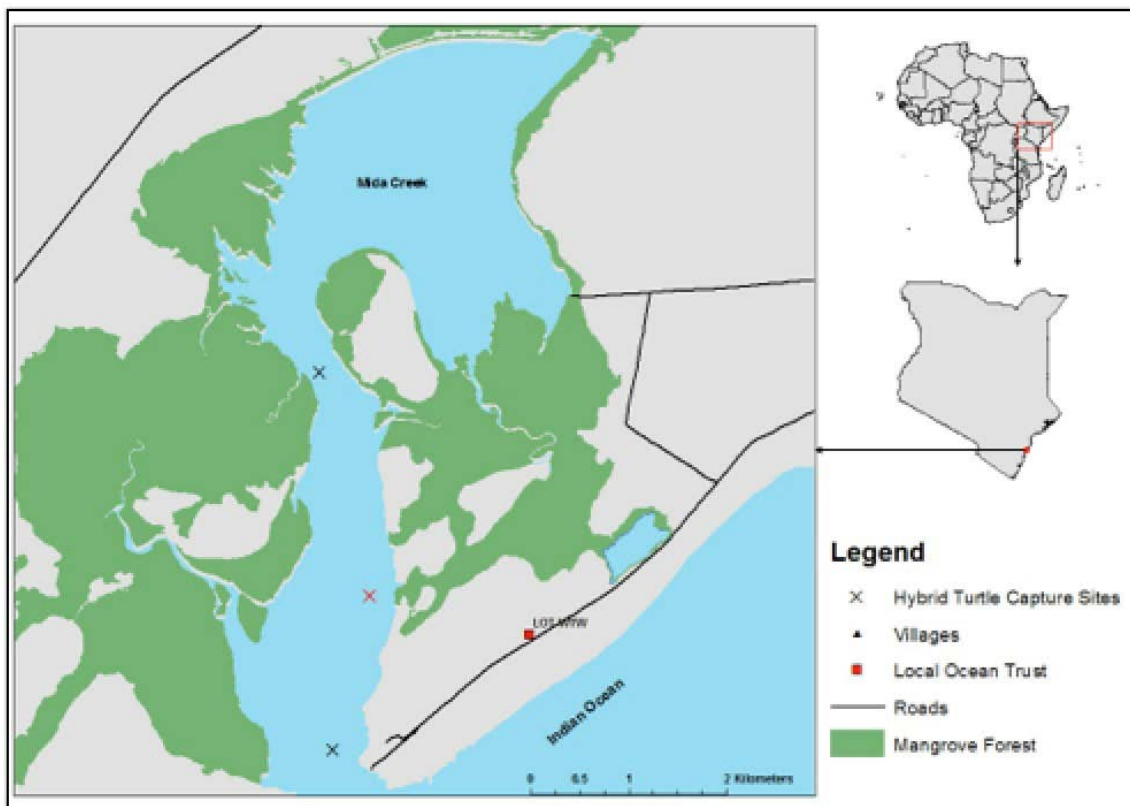


Figure 1. Capture sites of the hybrid turtle in Mida Creek.

Every turtle is measured, weighed, and flipper tagged. This allows for gathering of important data on the extent of turtle bycatch, the size and structure of local turtle populations, and their movements on local and regional scales. Strong anecdotal evidence from fishing communities in the area suggests that without the BCRP in Watamu, most of the captured turtles would have been poached. Over 12,000 turtle releases have been conducted since the start of the program.



Figure 2. One pair of pre-frontal scales observed in the hybrid turtle, typical of green turtles.

In August 2014, a juvenile turtle was encountered in the BCRP when it was caught in a net in Mida Creek (Fig. 1) and picked up by LOT staff. The turtle had a combination of external morphological features of both green and hawksbill turtles (Table 1). Therefore, the turtle was taken to LOT-WTW Turtle Rehabilitation Centre for closer examination.

The turtle weighed 6.94 kg and had a curved carapace length of 39.2 cm. The turtle had one pair of prefrontal scales on the head, and the lower jaw was serrated which are both features of green turtles (Wyneken 2001; Fig. 2).

However, the turtle had other features that were not consistent with characteristics of a green turtle. It had two visible claws on the front flippers, three post ocular scales and

some of the costal scutes (second through fourth) were overlapping (Figs 3- 5). These features are consistent with hawksbill turtles (Peter and Mortimer 1999).

The marginal scutes at the rostral end of the carapace could be described as typical green turtle morphology, scalloped but not serrated and not incurved above hind limbs (Peter and Mortimer 1999; Fig. 6).

Observing the marginal scutes towards the caudal end of the carapace, the shape changed and became progressively more typical of hawksbill morphology.



Figure 3. Two claws on the front flippers, typical of hawksbill turtles.



Figure 4. Three post ocular scales observed in hybrid turtle, typical of hawksbill turtles. Beak morphology is typical of green turtles.

Table 1. Comparison of morphological features of green turtles and hawksbills. The features indicated with (\*) were present on the captured hybrid turtle.

<b>Green turtle (<i>Chelonia mydas</i>)</b>	<b>Hawksbill turtle (<i>Eretmochelys imbricata</i>)</b>
1 claw on each front flipper	2 claws on each front flipper (*)
4 pairs of costal scutes do not overlap (*)	4 pairs of overlapping costal scutes (*)
Rounded marginal scutes (*)	Pointed marginal scutes (*)
1 pair of pre-frontal scales (*)	2 pairs of pre-frontal scales
4 pairs of postocular scales	3 pairs of postocular scales (*)

The posterior margin of the carapace was strongly serrated.

The turtle was admitted to the turtle rehabilitation centre for a week and various food items were offered, from sea grass to crabs and squid. The turtle ate sea grass almost exclusively, typical of green turtles (Fig. 7).



Figure 5. Overlapping scutes towards the caudal end of the carapace, a combination of green and hawksbill morphology.

After release from the turtle rehabilitation centre the turtle was recaptured a further three times, every time in nets. The recapture data suggests that the main foraging area of the turtle is Mida Creek area, where it was recaptured on all four occasions. This highlights the importance of Mida Creek as a critical sea turtle foraging habitat in Kenya. Further recaptures in the future will allow for close monitoring of the growth rate and health status of this hybrid turtle.

Inter-species hybridization in sea turtles has mostly been reported in the Pacific and Atlantic regions (Karl *et al.* 1995; James *et al.* 2004) but there are few reported sightings or published studies on sea turtle hybrids in the Indian Ocean and this is quite possibly the first reported case in the East Africa region.



Figure 6. Overlapping costal scutes and marginal scutes, a combination of green and hawksbill morphology.



Figure 7. Hybrid turtle swimming in a tank at the LOT-WTW Turtle Rehabilitation Centre.

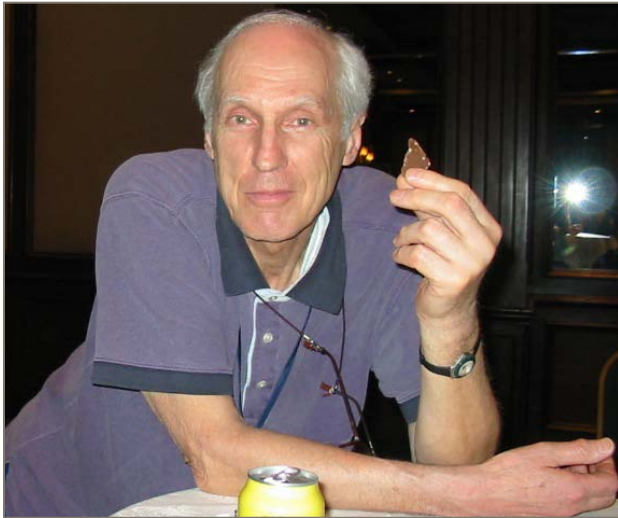
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## Remembering Nicholas Mrosovsky

Claude Pieau



Nicholas Mrosovsky was an ardent protector of marine turtles. During the course of his work, his interest focused on the phenomenon of Temperature-dependent Sex Determination (TSD). By the end of the 1970s, Nicholas had met Jean Lescure who began to develop together with Jacques Fretey a program on the conservation of marine turtles (mainly *Dermochelys coriacea*) in French Guiana. Jean drew Nicholas' attention to the fact that eggs extracted from the nests and incubated without controlling the temperature could lead to biased sex ratios at hatching. Jean referred to my own work on two turtle species, *Testudo graeca* and *Emys orbicularis* in which I had shown that in

artificial incubation, sexual differentiation of the gonads is dependent on temperature (Pieau 1971; 1972). Estimating the importance of such a mechanism for the massive introduction of turtle hatchlings into the sea, Nicholas contacted Chester L. Yntema who had shown the influence of the incubation temperature of eggs on sex determination in a third turtle species, *Chelydra serpentina* (Yntema 1976). They examined the effect of temperature in *Caretta caretta* and found, for the first time in a marine turtle, that the hatchling sex ratio depends on this factor (Yntema and Mrosovsky 1979). Since then, all marine turtle species have been shown to exhibit TSD. Among several other publications, Nicholas collaborated with Jean Lescure, Jacques Fretey, Frédérique Rimblot and me to study the effects of temperature on sexual differentiation in *Dermochelys coriacea* (Rimblot *et al.* 1985).

Given the explosion of research on TSD in reptiles in the 1980s, Nicholas and I organized, on Jean Lescure's suggestion, a Symposium on Environmental Sex Determination at the First World Congress of Herpetology that was held at Canterbury in 1989.

One of the preoccupations of Nicholas was the exact meaning of the words, expressions and concepts used in the publications. Thus, for TSD, he proposed that the notions of transitional range of temperature, pivotal temperatures and thermosensitive stages for sex determination be clearly defined (Mrosovsky and Pieau 1991). It is then that I could appreciate the subtlety and the rigor of his reasoning. It was a real pleasure to work with him. He came to my laboratory, Jacques Monod Institute, in Paris. We both participated in the Symposium on "Environmental Sex Determination in Reptiles: Patterns and Process" at the Annual Meeting of the American Society of Zoologists held at Vancouver in 1992. Coming back from Vancouver, I visited his laboratory in Toronto and he kindly invited me to visit his family.

With the passing of Nicholas Mrosovsky, the scientific community has lost a researcher, imaginative and rigorous as well, with a high standard of ethics. I have lost a friend.

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The African Sea Turtle Newsletter (ASTN) is a free, bi-annual international electronic publication about the biology and conservation of sea turtles in Africa, and the stories of people who work with sea turtles on this vast and diverse continent and its offshore islands. This publication hopes to increase communication and collaborations among all those working with sea turtles in Africa –scientists, conservationists, policy-makers, project managers, community members, students, professors, everyone!— as well as share news with the international sea turtle community.

Contributions can range from original scientific papers and natural history observations to opinions, anecdotes, local myths, taboos, pharmacopeia, and legends, as well as field experiences, workshops, education and awareness activities, and announcements. We will accept and publish contributions in English, French, Spanish, and Portuguese so that everyone can express themselves in the language they most feel comfortable.

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Brongersma, L.D. 1982. Marine turtles of the Eastern Atlantic ocean. Pp. 407-416. *In:* K.A. Bjorndal (Ed.) *Biology and Conservation of Sea Turtles*. Smithsonian Institution Press, Washington DC. 583 pp.

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Esta publicación aspira a fomentar la comunicación y la colaboración entre todos que trabajan con las tortugas marinas en África (científicos, conservacionistas, personas políticas, gerentes de proyectos, miembros de comunidades locales, estudiantes, profesores, todos!) Además de compartir las novedades que surjan entre los miembros de la comunidad internacional que trabajan con estas especies.

Se aceptan contribuciones al boletín desde artículos científicos hasta observaciones sobre el mundo natural, opiniones, anécdotas, mitos locales, farmacopea, leyendas, experiencias personales en el “campo”, talleres, actividades pedagógicas y anuncios de varios eventos. Se publicarán contribuciones en inglés, francés, español y portugués para que todos puedan expresarse en la lengua más conveniente.

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