

COMMUNITY BASED ENDANGERED MARINE SPECIES CONSERVATION TANZANIA

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Executive Summary

Between January and December 2010, 497 green turtle nests were recorded by Sea Sense with 40,264 sea turtle hatchlings safely reaching the sea. Peak nesting was in May and the hatching success rate was 71.54%. Surveys of sea turtle bycatch and foraging areas were conducted in Pangani District. 64 dead turtles were found (either slaughtered or caught in nets) along the coast. Sea turtle ecotourism activities generated revenue in Mafia, Temeke and Pangani Districts. Six Turtle Tour Guides were recruited and two training workshops held. Handicrafts training was provided to 40 women in Juani Island. Six live dugongs were sighted by local fishers in Rufiji and Mafia Districts and reported to Sea Sense. Four dugongs were drowned in gill nets in the Rufiji Delta including a mother / calf pair. Two dugong awareness workshops were held in Rufiji District targeting CFMA leaders. Four dead cetaceans were recorded. A World Environment Day celebration was held on June 5th in Pangani District. Presentations were given to several audiences: school pupils, students at the University of Dar es Salaam and members of the Dar es Salaam Yacht Club. Six magazine articles were published and two papers presented at the International Sea Turtle Symposium. Bycatch, satellite tagging and management planning workshops were attended. Four UDSM students completed a 12 week placement with Sea Sense. Illegal turtle slaughter, live coral mining, mangrove cutting and dynamite fishing continue to be practiced despite efforts to curb them.

1. Introduction

The Tanzania coastal region supports a diverse array of marine habitats, many of which are critical for the survival of coastal communities. There is significant pressure on marine and coastal resources related to high human settlement in the coastal zone coupled with high levels of poverty. High dependency on coastal resources has led to resource utilization at unsustainable levels and threatens the marine biodiversity of Tanzania and the livelihoods of coastal communities.

In recognition of this, Sea Sense, a community-based Tanzanian NGO, was set up in 2001 and currently operates in six coastal districts in Tanzania. Sea Sense targets the conservation and promotion of flagship species (e.g. sea turtles, dugongs, whales, dolphins), whose continued survival is implicitly linked with the protection of the wider coastal and marine ecosystem. Sea Sense works closely with coastal communities to deliver tangible conservation benefits, improve understanding and knowledge of natural resource management and develop sustainable livelihoods that bring positive economic outcomes for impoverished rural communities who depend solely on natural resources for their survival.

Activities started in Mafia District and in 2004, the scope of the NGO was scaled up to cover key districts on the mainland coast of Tanzania.

This report highlights activities and progress by Sea Sense during 2010.

2. Objectives

The overall objective is to enhance the conservation status of sea turtles, dugongs, whale sharks and other species of conservation interest, as well as their habitats in Tanzania by assessing population abundance, distribution and threats, raising awareness and helping communities to find alternatives to unsustainable activities.

The specific objectives are to:

- conserve dugongs by implementing the Conservation and Management Plan of the UNEP/CMS Memorandum of Understanding on Dugongs; incorporate conservation measures into Collaborative Fisheries Management Area action plans and disseminate results to communities through awareness-raising activities;
- protect endangered sea turtles through supporting a programme of community-based nest protection and monitoring; conducting community awareness-raising; and promoting sea turtle ecotourism;
- contribute to protection of whale sharks and cetaceans through community awareness-raising;

- increase public awareness and education about the status and threats to marine resources in Tanzania;
- enhance multilevel national capacity for monitoring, research and management; and
- disseminate results to national and regional partners and the wider scientific community.

3. Implementation & Results

3.1 Dugong Conservation

3.1.1 Live Dugong Sightings

In 2004, Sea Sense established a community dugong monitoring network in the Rufiji Delta to provide data on the distribution and abundance on dugongs. The network has confirmed the presence of a small, breeding population in the Rufiji Delta and has raised awareness of the plight of the dugong in Tanzanian waters. The majority of dugong sightings are reported to Sea Sense Conservation officers by members of the local fishing community.

There have been six live dugong sightings in 2010. Five of the observations were reported in Rufiji District, in the southern Delta and the sixth was on the west coast of Mafia Island, near to Tumbuju. This dugong is believed to be the same individual that has been seen repeatedly since October 2009. All observations were made by local fishers who reported the sightings to Sea Sense Conservation Officers.



Figure 1: Live dugong sightings, 2010

3.1.2 Dugong Mortalities

Four dugongs were reported drowned in gill nets including a mother and calf pair. All were caught in the Rufiji Delta. Three of the dead dugongs were taken to Bwejuu in Mafia Island Marine Park (MIMP) where they were slaughtered and their meat sold. This information was reported to MIMP wardens who followed the matter up with Bwejuu leaders. However, all leaders denied that the dugongs had been slaughtered in Bwejuu and the meat sold for consumption.

A summary of dugong records in 2010 is shown in Table 1.

Date	Location	District	Sex	Length	Dead / Live	Reported by
05/02/2010	Nyamisati	Rufiji	NA	NA	Dead	Fishers
21/02/2010	Tumbuju	Mafia	NA	1.5m	Live	Sea Sense staff
23/07/2010	Utikit river	Rufiji	NA	NA	Live	Fishers
02/08/2010	Dima	Rufiji	NA	NA	Dead	Fishers
08/08/2010	Ngoma river	Rufiji	NA	3.5m	Live	Fishers
15/08/2010	Ngoma river	Rufiji	F	2.5m	Live	Fishers
24/08/2010	Mwamba Malinda	Rufiji	NA	NA	Live	Fishers
10/10/2010	Ras Dima	Rufiji	NA	NA	Dead	Fishers
16/10/2010	Bwejuu	Mafia	F	NA	Live	Sea Sense staff

Table 1: Dugong Monitoring Network Records, 2010

Since Sea Sense commenced monitoring of dugong observations in 2004, 38 dugong sightings have been reported to Sea Sense. Of these, 22 were live sightings, 15 had drowned from capture in gillnets and one was washed up dead on a beach. Even though sightings are still rare, there is clear evidence that a small, breeding population exists in the Rufiji Delta. Sea Sense is using data collected by the monitoring network to develop mitigation measures aimed at reducing gill net mortality eg, promotion of temporal and spatial closures in key dugong habitat and to ensure community training and education programmes are targeted effectively. It is critical that conservation efforts are directed at reducing mortality from gill nets as the current rate of gill net capture is not sustainable for a population that is thought to be less than 100 individuals.

3.1.3 Dugong Workshops

The increased degradation of coastal and marine ecosystems and decreases in yield of important fish stocks in Tanzania has led to the development of Collaborative Fisheries Management Areas (CFMA's) as a vehicle for achieving sustainable marine resource use and engaging coastal communities in their conservation. In November, Sea Sense held two dugong awareness workshops targeting the Central Coordinating Committees of two CFMA's in Rufiji and Kilwa Districts. The objectives of the workshops were:

- To determine the level of understanding of their roles and responsibilities within the CFMA
- For CCC's to share their background knowledge of dugongs in Tanzania.
- To improve understanding of the status of dugongs in Tanzania and their global range
- For CCC's to determine natural and anthropogenic threats faced by dugongs and other endangered marine species.
- To facilitate incorporation of dugong protection measures into CFMA action plans
- To raise awareness of the updated Fisheries Regulations 2009 that incorporate new legislation on the protection of endangered marine species
- To raise awareness of the establishment of the national Tanzania Turtle and Dugong Conservation Committee

To assess the level of knowledge and understanding prior to the training, the participants were invited to form small groups of 4 – 5 members and discuss a list of topics provided by Sea Sense.

Discussions points:

1. What are CFMA's and their objectives?
2. What are the CFMAs geographical boundaries and the activities they are responsible for?
3. Historical knowledge of dugong distribution and abundance in Tanzania
4. Current status of dugongs in Tanzania and their global range?
5. What are the anthropogenic threats faced by dugongs and other endangered marine species?
6. How can future CFMAs action plans incorporate conservation and protection of these endangered marine species?
7. What are the Tanzania Fisheries Regulations in relation to endangered marine species

Following the group discussions, one member from each group presented their findings to the rest of the workshop participants. Based on the presentations, it was clear that CCC members had limited knowledge of dugong conservation and saw no reason for their protection under national and international law. They saw little opportunity to benefit from dugong conservation and did not regard it as a priority for their local resource action plans. None of the participants were able to explain why dugong sightings are now so rare in the Rufiji Delta and many believed that dugongs had simply migrated elsewhere in search of new feeding grounds.

After the presentations, the Sea Sense team presented information about CFMA's, dugong biology and Tanzania Fisheries Regulations and resolved any outstanding confusion arising from the group presentations. Workshop participants together with Sea Sense then embarked on

lengthy discussions regarding the challenges of dugong conservation and brainstormed potential strategies and opportunities to overcome them. The workshops gave the participants an important insight into the conservation of endangered marine species and the impact of human activities that have caused them to become endangered.



Plate 1: Group discussions amongst CFMA members on dugong conservation

After long discussions, using many historical examples when dugongs were abundant, the participants began to recognise the importance of protecting and managing the surviving population of dugongs and other endangered marine species within their working range. Participants also acknowledged the importance of protecting the dugong outside of the Rufiji Delta due to its migratory nature.

Further training and education for CFMA leaders on the conservation of marine resources, particularly endangered marine species, is planned for early 2011. Such training is a top priority for Sea Sense as most leaders, at present, do not understand the role of species such as sea turtles and dugongs in the wider marine ecosystem and do not see any benefit in conserving them. Capacity building within the CFMA is also critical to ensure leaders have the knowledge and skills to manage local resources effectively and provide quality leadership to the wider community in a transparent and strategic way.

3.2 Sea Turtle Conservation

3.2.1 Sea Turtle Nest Monitoring and Protection

A total of 497 nests were recorded in 2010 with the successful hatching of 40,264 hatchlings. All were laid by green turtles. It is possible that some hawksbill nesting took place on offshore islands (Shungmbili) on the west coast of Mafia Island but due to inaccessibility at certain times of the year, some nests may have been missed.

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The average hatching success rate was 71.54%. 31 nests did not hatch, either because they were inundated by the high tide, poached, predated or the eggs rotted. Four nests were partially predated but some hatchlings survived and hatched successfully. Since 2001, 2,686 nests have been recorded and monitored by Sea Sense and 191,684 baby turtles have safely reached the sea.

Mafia Island continues to be the most important nesting site for endangered sea turtles in Tanzania. Temeke District also supports a significant nesting population. Maziwe Island in Pangani District is still utilised by nesting green turtles despite being inundated on a high tide. The Sea Sense team translocates nests from Maziwe Island to the mainland for safe incubation and successful hatchings represented 60% of all recorded hatchings in Pangani District in 2010.

Table 2 shows Sea Sense turtle nest data for 2010.

District	No. of nests laid	No. of hatchlings	No. of nests poached	No. of nests predated or partially predated	No. of nests inundated	No. of nests rotted	Nests still incubating at end of 2010
Kilwa	0	0	0	0	0	0	0
Mafia	250	22,505	3	4	3	0	5
Mkuranga	0	0	0	0	0	0	0
Muheza	1	0	0	0	0	0	0
Rufiji	0	0	0	0	0	0	0
Pangani	99	6,870	1	0	1	0	5
Tanga	0	0	0	0	0	0	0
Temeke	147	10,889	2	9	3	5	12
TOTAL	497	40,264	6	13	7	5	22

Table 2: Sea Sense Turtle Nesting Data, Tanzania, 2010

In addition, 17 nests were laid in 2009 but hatched in early 2010, resulting in 1,343 turtle hatchlings.

Figure 1 displays the monthly distribution of nests. Sea turtles are nesting on Tanzania's beaches all year round with 2010 showing a noticeable peak in the month of May. This peak is slightly later than recorded in previous years.

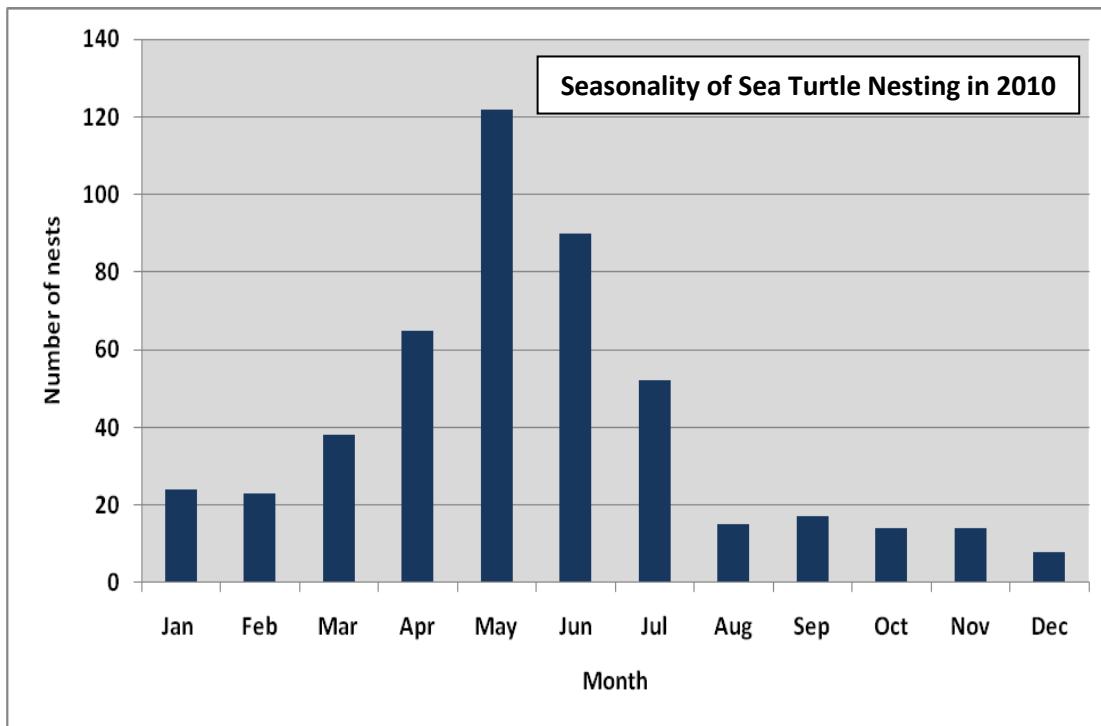


Fig 2: Seasonality of Sea Turtle Nesting in Tanzania, 2010

3.2.2 Tagging

During 2010, Sea Sense tagged six green turtles with titanium flipper tags displaying ID numbers specific to Tanzania. Five nesting green turtles were tagged by Conservation Officers in Temeke District and one green turtle was tagged whilst nesting on Mvinjeni beach in Juani, Mafia Island. No previously tagged turtles were observed nesting.

Flipper tagging is currently done on an opportunistic basis but an intensive tagging programme is planned in Juani Island, Mafia District, during the eight week nesting peak in 2011. The objective of the intensive tagging programme is to collect data on the status of the nesting population in Juani, identify intra-nesting durations, clutch frequencies, levels of nest site fidelity and post nesting migratory periods. Such information is vital to the development of effective sea turtle management strategies.

3.2.3 Sea Turtle Mortalities

64 dead turtles were recorded washed up on Tanzania's beaches or found floating at sea. This is significantly less than has been reported in previous years of monitoring and does not reflect the true extent of sea turtle mortalities in Tanzania. This can most likely be attributed to the fact that during 2010, Sea Sense Conservation Officers in Rufiji and Kilwa Districts were not collecting data on a regular basis due to a shortage of funding to support their activities. There is a high rate of sea turtle mortality in Rufiji and Kilwa Districts due to intense fishing pressure and a high level of illegal activities including sea turtle slaughter.

Based on carapace determination, 52 mortalities were green turtles, five were hawksbill, three were olive ridley and four were unidentified. Table 3 shows turtle mortality data collected by Sea Sense in 2010.

Location	Green	Hawksbill	Olive ridley	Unidentified	Total
Temeke	24	1	1	0	26
Rufiji	14	3	0	0	17
Kilwa	0	0	0	0	0
Tanga	0	0	0	0	0
Muheza	0	0	0	1	1
Pangani	13	0	2	3	18
Mkuranga	0	0	0	0	0
Mafia	1	1	0	0	2
Total	52	5	3	4	64

Table 3: Sea Sense Turtle Mortality Data, 2010

The average curved carapace length (CCL) of the stranded green turtles was 67.7cm ($SD \pm 23.1$) and the average curved carapace width was 63.3cm ($SD \pm 22$). The CCL measurements are well below average carapace length for breeding green turtles (CCL 95cm) which suggests that Tanzanian waters are an important foraging ground for juvenile green turtles but pose a significant threat to their survival.

70% of the mortalities were female, 8% were male and in 22% of cases, the sex was indeterminable.

Many of the stranded turtles showed evidence of knife injuries to the head and neck region and some had had their flippers cut off. Evidence from other specimens suggested they had drowned in nets. Many were decayed so it was therefore impossible to determine the cause of death.

Sea turtle stranding data is being used to identify communities who frequently slaughter sea turtles so that details can be reported to the appropriate authorities for action. Data is also helping to ensure education and awareness programmes target those communities who repeatedly participate in this illegal activity. In addition, stranding data helps to identify areas of high risk from fisheries interactions, enabling Sea Sense to focus bycatch reduction efforts effectively.

3.2.4 Survey of Sea Turtle Bycatch

One of the most significant threats to endangered marine species is interactions with both in-shore and off-shore fisheries. A workshop in Mayotte in 2006 comprising biologists, fisheries

scientists and coastal managers identified the coastal gill net fishery as the single biggest threat to sea turtles, dugongs and cetaceans in Tanzania and indeed the Western Indian Ocean region. However, there remains a paucity of empirical data on the true extent of this threat in Tanzania.

In April 2010, Sea Sense, in collaboration with Tanzania Fisheries Research Institute (TAFIRI), conducted a survey of artisanal gill net fisheries in three coastal villages in Pangani District: Mkwaja, Ushongo and Kipumbwi.

One to one interviews with gill net fishers were conducted by Sea Sense and TAFIRI staff, all of whom had experience in conducting bycatch surveys. Standard questionnaires were used to capture data on fishing gears, fishing effort and the level of endangered species bycatch. A map was also attached to the questionnaire to enable fishers to identify their fishing grounds. A short questionnaire (5 minutes) was completed if time was limited, but if more time was available, longer 30 - 40 minute questionnaires were carried out.



Plate 2: Gill net fisher interviews, Ushongo village, Pangani District

A total of 80 interview questionnaires were completed: 27 in Mkwaja, 31 in Ushongo and 22 in Kipumbwi. 67 respondents reported to use gillnets on a regular basis. 13% (n: 9) of gillnet fishers reported catching sea turtles in both bottom and top set gillnets soaked for 24 hour periods. Sea turtles were mainly caught in sea grass beds, shallow waters and rock substrata which are important foraging and resting sites for sea turtles as well as areas of high fish productivity. Most captures were of hawksbill turtles. Fishers estimated that they caught an average of two to ten sea turtles annually. In some cases fishers reported that they release the sea turtles when alive. However, during informal discussions many fishers admitted to killing and eating or selling live turtles they had captured in spite of being aware of the penalty for committing such an offence.

It was also observed that there was significant fishing pressure in the area due to an increase in immigrant fishers and fishing crafts. Some of the fishers (mostly gillnetters) hesitated to clarify the status of their boat registration as well as fishing licences. Some fishers were apprehensive

about participating in the survey and were reluctant to provide information about their fishing activities. Others provided false information due to fear of being banned from accessing their productive fishing grounds. To help reduce fear and suspicion of marine conservation activities, Sea Sense intends to conduct further village meetings and show awareness raising DVD's in key villages.

A full report of the bycatch survey is available from Sea Sense. The report has been circulated to the Fisheries Development Division (Ministry of Livestock Development & Fisheries) and Tanzania Fisheries Research Institute.

3.2.5 Survey of Sea Turtle Foraging Grounds

The Sea Sense nest monitoring and protection programme is providing important information about sea turtle nesting activity but there are significant data gaps in relation to sea turtle population dynamics, feeding and developmental habitats and the level of threat from fisheries.

To address some of these data gaps, Sea Sense conducted a survey of sea turtle foraging grounds at four sites in Pangani District to assess the status of sea turtle populations, determine species distribution and abundance and assess the quality of critical sea turtle habitat.

Four survey sites were selected based on information from local fishers: Maziwe Island, Zinga Island, Datcha reef near to Ushongo village and Buyuni Island in Saadani National Park. A random 150m² quadrat was surveyed at each site. Each quadrat was further divided into nine quadrats of 50m² as shown in Figure 2.

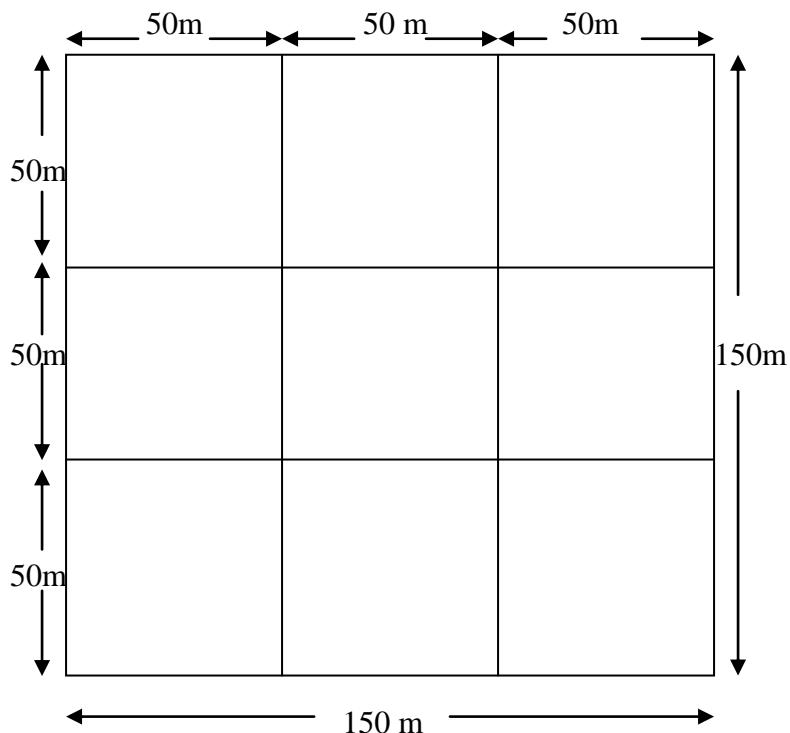


Figure 3: Demarcation of sampling area

A team of two persons surveyed each quadrat using belt transect methodology. Each surveyor swam in a straight line while observing 12.5m from each side to cover the whole 50m² quadrat. Within each quadrat, the species, number, distribution and behaviour of each turtle was recorded and the habitat type identified.

93 sea turtles were recorded during the surveys. Table 4 shows the distribution of sea turtles per survey location.

Location	Number of Sea Turtle Species Recorded				
	Green	Hawksbill	Loggerhead	Leatherback	Olive ridley
Maziwe Island	49	6	0	0	0
Zinga Island	6	32	0	0	0
Buyuni Island	0	0	0	0	0
Datcha Reef	0	0	0	0	0
TOTAL	55	38	0	0	0

Table 4: Distribution of sea turtle species per survey site

The results of the survey showed that Maziwe Island is an important site for green turtles whereas Zinga Island supports larger populations of hawksbill turtles. The distribution of sea turtle species is correlated to the habitat type at each location. Maziwe Island has a high density of sea grasses which are an important food source for adult green turtles. Hawksbill turtles forage on coral reefs which were recorded in high abundance at Zinga Island.

The behaviour of each sea turtle encountered was recorded and categorised as either foraging, swimming, mating or resting. Figure 4 shows the behaviours recorded at each site.

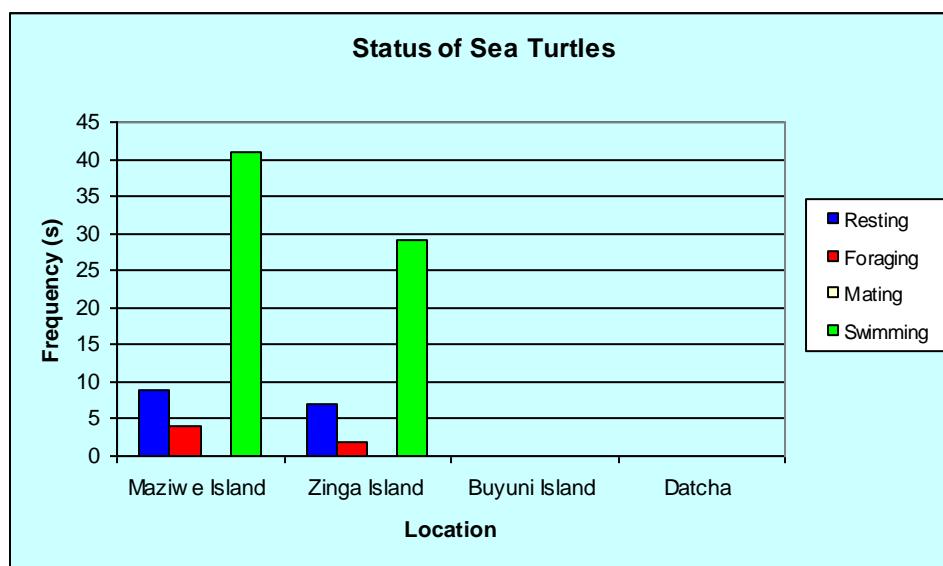


Figure 4: Sea turtle behaviour at each location

Although no sea turtles were observed at Buyuni Island and Datcha reefs during the survey, local fishers report that they frequently encounter sea turtles at both locations. Datcha reef is subject to temporal and spatial closures to reduce fishing pressure. During the surveys the reef was open to fishing which may have caused the turtles to move to another area for foraging.

Sea Sense recommends that Zinga Island be designated as a Marine Reserve to preserve the foraging grounds of critically endangered hawksbill turtles. Further effort is also needed for the conservation and protection of Maziwe Island which despite being protected, is subject to high levels of illegal fishing within the reserve boundaries.

3.2.6 Sea Turtle Ecotourism

Mafia, Temeke and Pangani Districts are the main nesting sites in Tanzania for endangered green turtles. Due to the presence of a number of hotels in the vicinity of sea turtle nesting beaches in these Districts, Sea Sense has implemented a sea turtle ecotourism initiative to generate a sustainable source of revenue for sea turtle conservation and local community development projects.

3.2.6.1 Turtle Tour Guides

In Mafia and Temeke Districts, six ‘Turtle Tour Guides’ were recruited from the local community. The Tour Guides are responsible for guiding visitors to turtle nesting beaches, assisting the Conservation Officer during a hatching event, providing information about sea turtle conservation and helping to provide a safe and enjoyable turtle viewing experience, ensuring the welfare of the turtle hatchlings is protected. Visitors pay a modest fee to witness a turtle nest hatching event. Half of the revenue generated by sea turtle ecotourism is used to fund further endangered species conservation work and the other half is directed into ‘Village Environment Funds’ established by Sea Sense.

A three day training workshop for the new Tour Guides was held in Mafia District in April and in Temeke District in July. The first two days of the training were theory based and included presentations from Sea Sense staff on sea turtle biology and conservation, threats to their survival and the role of ecotourism in sea turtle conservation. Mafia Island Marine Park (MIMP) wardens also gave an overview of tourism in MIMP and presented details of the MIMP tourism strategy and Code of Conduct.

A question and answer session followed each presentation together with group discussions to stimulate conversation, exchange of ideas and encourage participation. A number of quizzes, role plays and re-cap sessions were also held to ensure a variety of learning media. At the end of each day a sea turtle conservation DVD was shown to provide further supporting information.

On the third day, all workshop participants travelled with Sea Sense staff to a turtle nesting beach to conduct a demonstration ‘turtle tour’ and put their learning into practice. Each trainee was allocated to a Sea Sense staff member and then responsible for guiding their

'visitor' to the nesting beach, providing information about sea turtles and Sea Sense conservation activities and answering any questions arising from the experience.



Plate 3: Tour Guide role plays, Mafia Island

The role play was enjoyed by all of the trainees and helped to identify which areas of the job they found most challenging and needed to improve.

By the end of 2010 the Tour Guides had been in post for eight months. Each Tour Guide has received a Sea Sense Tour Guide t-shirt and an ID badge. Their guiding skills are developing and Sea Sense continues to provide ongoing training and support.

3.2.6.2 Ecotourism Infrastructure

Stakeholder meetings were held in May and June with MIMP, local hoteliers and Juani Village Council in Mafia District to discuss opportunities for improving sea turtle ecotourism in Juani Island and ensure the delivery of a quality experience. The clearance of access routes to nesting beaches was identified as a top priority and the Juani community agreed to participate in the clearance work.

Work parties comprising members of the Juani community together with Sea Sense staff were assembled in June 2010. Two routes (to Yuyuni and Kishiko Kikubwa beaches) were cleared of overhanging and side vegetation to create a clearly defined path. The community have agreed to monitor re-growth along the routes and clear as necessary.



Plate 4: Route clearance team, Juani village

3.2.6.3 Income Generation

Several meetings were held with hoteliers in Mafia District to establish an effective revenue collection system for sea turtle ecotourism. All participating hoteliers agreed to donate a fixed amount to Sea Sense for each excursion to a sea turtle nesting beach.

Once the agreed pricing structure was established, Sea Sense held a meeting with Juani village council leaders to provide feedback and ensure that the revenue collection and distribution system was clear and transparent to all project beneficiaries. Ecotourism revenue was transferred to a 'Village Environment Fund' in Juani on a six monthly basis and village leaders were requested to communicate this information to the wider community to ensure that the community was aware of the economic benefits of sea turtle conservation. The fund was established by Sea Sense to support community development projects but the community themselves decide how the money should be spent.

Meetings have also been held with stakeholders to establish a revenue collection and distribution system in Temeke District. Following extensive discussions, a fixed fee for participating in sea turtle ecotourism was also agreed upon. Many visitors to turtle nesting beaches in Temeke were residents of Dar es Salaam undertaking a day trip to witness a turtle hatching event. In such cases, payment was made at the Sea Sense office prior to the hatching event and transfers were made to the Village Environment Fund in Amani Gomvu village.

In Pangani District, Sea Sense is collaborating with a dive operator near to Ushongo village to promote sea turtle ecotourism. Visitors make a voluntary donation which is collected by the dive operators. At present, the donations are used to fund a boat and fuel so that the community can undertake patrols to Maziwe Island to translocate the nests. By the end of

2010, the initiative had grown significantly and was generating revenue in excess of project costs. A meeting with Ushongo village council is scheduled for early 2011 to discuss the donation of ecotourism revenue to the village for community development projects.

Table 5 shows income generated from sea turtle ecotourism at each location during 2010.

Village	District	Income (\$)
Amani Gomvu	Temeke	697
Kimbiji	Temeke	181
Mbutu	Temeke	491
Juani	Mafia	2,132*
Ushongo	Pangani	N/A

Table 5: Ecotourism income generation, 2010

* Some further revenue still outstanding for period Oct – Dec 2010

3.2.6.4 Ecotourism Partnerships

In early May, Sea Sense formed a link with a local safari operator (Authentic Tanzania) in Dar es Salaam to promote sea turtle ecotourism in Temeke District. Sea Sense met with Authentic Tanzania staff to discuss potential ways of marketing sea turtle ecotourism and generate a sustainable source of revenue for local communities.

Authentic Tanzania produced a flier to promote sea turtle viewing in collaboration with Sea Sense and has distributed it widely in Tanzania. Their staff have received training from Sea Sense in turtle biology and conservation and have been issued with the Sea Sense Endangered Species Training manual.

40% of the cost of each excursion is donated to Sea Sense. Since the partnership began in May, Authentic Tanzania has raised \$1,130 for Sea Sense.

3.2.7 Turtle Nest Adoption Scheme

Sea Sense promotes a sea turtle nest adoption scheme to generate further revenue to support sea turtle conservation activities. A sea turtle adoption pack has been produced which contains an adoption certificate, a sea turtle poster, photographs of hatchlings, a children's puzzle page and a bookmark. The pack provides information on sea turtle biology and life history, sea turtle conservation in Tanzania and the role of communities in sea turtle protection.

A sea turtle adoption costs \$50. During 2010, 35 nests were adopted, generating \$1,750.

3.3 Whale Shark Conservation

There have been no specific conservation activities related to whale sharks during 2010 due to funding issues.

3.4 Cetacean Conservation

3.4.1 Cetacean Mortalities

Sea Sense Conservation Officers collect data on cetacean mortalities during their daily patrols.

In 2010, four mortalities were recorded, as shown in Table 6.

Date	District	Location	Species	Comments
08/01/2010	Rufiji	Ras Dima	Unidentified dolphin	Captured by fishers and killed
08/05/2010	Rufiji	Off shore	Unidentified dolphin	Found dead on beach
08/10/2010	Rufiji	Off shore	Sperm whale	Sighted at sea
11/10/2010	Rufiji	Ras Dima	Sperm whale	Sighted at sea

Table 6: Cetacean mortalities recorded by Sea Sense in 2010

3.5 Community Participation

3.5.1 Conservation Officers

For the majority of 2010, the Sea Sense Conservation Officer (CO) network comprised 30 CO's in six coastal districts. CO's operated in Mafia (6), Temeke (13), Mkuranga (4), Pangani (4), Tanga (2) and Muheza (1), conducting daily patrols to collect data on endangered marine species, monitor and report illegal activities and raise awareness in their communities.

Between January and October 2010, CO's were active in Rufiji and Kilwa on a voluntary basis due to a lack of funding. However, funding for marine conservation activities in Rufiji and Kilwa was secured at the end of 2010 and six CO's were reinstated on a formal basis.

In July, three CO's were removed from Tanga and Muheza due to poor work performance. They have not been replaced.

3.5.2 Sea Turtle Nest Incentive Scheme

Sea Sense operates a nest incentive scheme whereby small financial incentives are given to villagers who report sea turtle nests. Incentives consist of a founder incentive of TSh 5,000, TSh 100 for every egg that hatches successfully and TSh 50 for every egg that fails to hatch. The scheme has proven to be a successful way of involving local communities in sea turtle conservation and enhancing perceptions of the value of live sea turtles.

3.5.3 Village Meetings

Regular meetings were held in all villages where Sea Sense is currently conducting marine conservation activities to elicit support for project activities and ensure that communities remain fully aware of and engaged in Sea Sense activities. Issues relating to marine conservation in general and more specifically endangered species, illegal fishing, coral mining, mangrove cutting and sea cucumber exploitation were discussed.



Plate 5: Village Council meeting, Pangani District

3.5.4 Beach Management Unit Interviews

One to one interviews were conducted with members of Beach Management Units (BMU's) in three villages in Temeke District to assess the level of knowledge and understanding of the objectives of BMU's and their role in natural resource management. Interviews were conducted in Kizito, Buyuni and Pemba Mnazi villages.

A total of 33 interviews were completed. Results showed that 95% of the interviewees understood the objectives of BMU's and were aware of the procedures for their establishment. Almost 60% of interviewees were able to answer questions about endangered marine species and the impacts of human activities on them.



Plate 6: Beach Management Unit Interviews, Temeke District

Despite the positive responses there is still a lack of conservation knowledge in coastal communities. Participation in the survey was poor and it is likely that the results were biased. Only those people who had some knowledge were willing to answer the questions. Many BMU members were not willing to participate due to an inferiority complex caused by a lack of conservation knowledge.

It was apparent during the surveys that many BMU members did not feel responsible for conservation of natural resources and believed that government and non-governmental organizations are the responsible agencies. Many BMU members believed their role to be solely related to revenue collection. Sea Sense has planned further awareness training for BMU leaders in 2011 to help build capacity and improve understanding of the responsibility that BMU members have in the management of marine resources.

3.6 Training

3.6.1 Handicrafts Training

To reduce pressure on critical marine resources, Sea Sense works closely with local communities to develop alternatives to unsustainable fishing practices that threaten the survival of endangered sea turtles and dugongs. In July, a meeting was held with a women's group in Juani village, Mafia District to discuss the potential for developing local handicrafts for sale to visitors participating in sea turtle ecotourism. The meeting was attended by 13 women who expressed an interest in developing their skills in weaving to expand the variety of products they could make. It was agreed that the group needed further training in handicrafts production.

A week long training workshop was organised by Sea Sense in November. A handicrafts expert from Dar es Salaam spent a week in Juani with the handicrafts group and provided training in grass cutting, dying and weaving. The training caused considerable interest in the village and by

the end of the week over 40 women had been trained and 15 bags had been produced for sale to visitors to Juani.



Plate 7: Handicrafts group, Juani Island at the end of the training session

The women have since received training from Mafia District Council in entrepreneurial skills including marketing, pricing and management of revenue. The project is helping to generate important revenue for the community and is supporting Sea Sense efforts to engage the wider community in marine conservation and protection. A further training session is planned for early 2011.

3.6.2 English Lessons

During the first half of 2010, eight Conservation Officers in Temeke District completed an eight month English Language training course. The aim of the course was to help improve their language skills to enable them to communicate more effectively with visitors who are participating in Sea Sense turtle ecotourism initiatives. Sea Sense was awarded funds from the Dar es Salaam Charity Goat Races to provide the training.

Classes were conducted by an English teacher from a local secondary school in Temeke District. Classes took place three times per week and consisted of oral and written exercises, role plays and group work. Five text books and a dictionary were purchased for each student, together with notebooks and pens.

Since the training there has been a considerable improvement in the language skills of the Conservation Officers. Their confidence has increased as has their ability and willingness to communicate in English.

3.6.3 UDSM Students

Between August and October, four students from the University of Dar es Salaam completed an eight week placement at Sea Sense. The students undertook several administrative tasks in the Sea Sense office including a desk study of international dugong conservation strategies, preparation of field work programmes and report writing.

The students also undertook a number of field activities including an assessment of knowledge amongst BMU leaders in Temeke District, surveys of sea turtle nesting beaches and data collection.

3.7 Education and Awareness

3.7.1 World Environment Day

To celebrate World Environment Day (5th June), Sea Sense organized a primary school competition involving five schools in Pangani District: Funguni, Pangani, Ushongo, Boza and Mwera. The aim of the competition was to raise awareness of endangered marine species and the importance of conserving and protecting the marine environment. The competition was organized in collaboration with Pangani District Education Officers (DEOs). Each school was visited by a DEO to introduce the competition and encourage the students to participate. Students were asked to prepare song, drama and poetry about the marine environment. After two weeks, the DEO visited each school again with Sea Sense staff to judge the entries based on theme, content and imagination. The top two song, drama and poetry acts were invited to perform again at a ceremony on World Environment Day (WED).

The WED ceremony was held in Ushongo village and was opened by the Pangani District Commissioner who gave a welcome speech supporting the work of Sea Sense and reminded all participants of the importance of environmental protection. Each of the selected students performed their song / drama / poetry and the judges selected overall winners in each category.



Plate 8: WED performers, Ushongo village

Prizes were awarded to the winning schools including books, maths sets and other school equipment. Every participating student was given a Sea Sense t-shirt celebrating ‘2010 International Year of Biodiversity’.

Hundreds of local villagers attended the ceremony and it proved to be a very successful event, raising much needed awareness about marine conservation. Following the ceremony, the District Commissioner and District Education Officers visited a beach where sea turtle nests were incubating. The Sea Sense Field Officer provided important information about the Sea Sense community turtle nest protection and monitoring scheme and responded to questions from the officials.

3.7.2 Knowledge Assessments at Secondary Schools in Temeke District

In March, two students from the University of Dar es Salaam conducted an assessment of the knowledge and understanding of secondary school pupils and their teachers on conservation issues specifically related to endangered marine species and the marine environment. The objectives of the survey were to

- Determine the level of knowledge and understanding amongst pupils and teachers on the importance of marine resource conservation
- Determine their understanding of the negative impacts of human activities on endangered marine species
- Assess the level of inclusion of marine environmental conservation in the school curriculum
- Prepare a report of the findings for presentation to Temeke District Education Officers

Assessments were undertaken in nine randomly selected schools in Temeke (n: 5) and Kinondoni (n: 4) Districts. Data were collected through one to one and group interviews using a standardised questionnaire designed by Sea Sense. A total of 238 questionnaire forms were completed, which consisted of 30 teachers and 208 pupils.

Results showed that more than 50% of the interviewees did not understand the meaning of the term ‘marine environment’. Similarly, many were unaware of endangered marine species and were not familiar with organizations responsible for protecting critical coastal resources. Many did not consider environmental protection to be important and believed it to be the responsibility of the government, because those resources belong to the government. This clearly indicates a lack of understanding of the need for local participation in the management and protection of natural resources.

Sea Sense intends to present the findings of the study to District Education Officers in Temeke District to demonstrate the urgent need for the inclusion of marine conservation and resource

use in the national curriculum. It is critical to instil knowledge and understanding amongst young people as they have considerable influence within the community as an educated group.

3.7.3 International Beach Clean Up Day

In September, Sea Sense and the ‘Roots and Shoots’ group from IST Secondary School took part in a beach clean-up in Visikini in Temeke District. Many bags of rubbish were collected including lots of plastics which are extremely harmful to sea turtles and other marine life.



Plate 9: IST students during the beach clean-up with some of the collected rubbish.

3.7.4 Media and Magazine Releases

An article was published in the January 2010 edition of the ‘Indian Ocean Turtle Newsletter’. The newsletter is a forum for exchange of information on sea turtle biology, conservation and management and education and awareness activities in the Indian subcontinent, Indian Ocean region and south/southeast Asia. The newsletter also covers related aspects such as coastal zone management, fisheries and marine biology and is distributed free of cost to a network of government and non-government organisations and individuals in the region. The Sea Sense article describes a multi-stakeholder approach to sea turtle conservation in Tanzania.

An article written by Sea Sense was published in the WIOMSA magazine in April 2010. The article featured details of the first live sighting of a dugong in Mafia waters since the 1970’s. The article also described a range of conservation efforts implemented by Sea Sense to conserve and protect the dugong population in the Rufiji Delta.

An article on Sea Sense turtle conservation activities was published in Salt & Pepper in September 10. The magazine is a ‘lifestyle’ magazine and features an NGO of the month in each edition. Sea Sense was selected as the NGO for the launch of the magazine in September. The

article described the work of Sea Sense and its' achievements in marine conservation over the past ten years.

Sea Sense also writes a monthly article for the Dar es Salaam Yacht Club magazine. Articles have covered topics including sea turtle biology, dugong conservation, ecotourism, dynamite fishing and community engagement.

3.7.5 Education and Awareness Presentations

The Sea Sense Education Officer gave presentations on endangered marine species conservation to classes at the Elementary and Secondary International School of Tanganyika (IST) and Dar International Academy (DIA) in Dar es Salaam.

Sea Sense education sessions at IST had a significant impact. Many of the students chose marine conservation as their topic for their final exhibition in May. The students created some inspiring exhibitions and raised funds for Sea Sense by selling t-shirts and collecting donations. A competition was held to design the latest Sea Sense t-shirt and was won by a Grade 4 student.



Plate 10: IST exhibition on dolphin conservation

A presentation on the work of Sea Sense was also given to the 'Roots and Shoots' group at IST Secondary School who had conducted some fund raising for Sea Sense and were keen to hear how the money would be spent to conserve marine life in Tanzania.

In March, the Sea Sense Education Officer gave a lecture to final year students studying Aquatic Environmental Sciences and Conservation at the University of Dar es Salaam. The lecture

included aspects of sea turtle biology and life history, current conservation initiatives in Tanzania and the role of key stakeholders in natural resource management.

In September, the Sea Sense Coordinator gave a presentation on endangered marine species at the Dar es Salaam Yacht Club. The presentation was part of programme of activities for an international sailing regatta being held at the club. The event enabled Sea Sense to raise awareness to an audience beyond Tanzania.

3.7.6 DIA Community and Service Programme

Dar International Academy is currently running a school volunteer programme whereby students volunteer on different projects in the wider community once every two weeks. A group of students at the school have signed up to volunteer with Sea Sense and are conducting marine conservation projects in the local area. So far the students have conducted a beach clean-up, raised awareness of sea turtle ecotourism at local hotels and promoted the Sea Sense ‘Adopt a Turtle Nest’ programme. The students have received training from Sea Sense staff in sea turtle identification techniques and in early 2011 will take part in a ‘Junior Conservation Officer’ day.

3.7.7 Dar es Salaam Charity Goat Races

Sea Sense was present again at the 2010 Charity Goat Races in Dar es Salaam. The Sea Sense stand was full of information about endangered marine species and attracted hundreds of interested visitors. Sea Sense staff distributed a selection of awareness and education materials and encouraged visitors adopt a sea turtle nest. Sea Sense t-shirts were also for sale to celebrate the 2010 International Year of Biodiversity.

3.7.8 Moving Sushi

Moving Sushi is a marine expedition that has travelled across 42 countries over the period of two years to film an objective documentary concerning the exploitation of marine resources and document people and projects from around the globe that are making a difference in marine conservation. The expedition team arrived in Tanzania in May and contacted Sea Sense to request an interview. The crew also visited a Sea Sense project site in Pangani District to film community Conservation Officers at work.



Plate 11: The Moving Sushi crew film the Sea Sense Conservation Officers at work in Pangani District

After the end of two years of filming the crew are now editing their documentary which will be aired across Africa. A series of children's books, exhibitions and lectures are also being developed using material from the expedition.

3.8 Dynamite Fishing

Although illegal and highly dangerous, dynamite fishing continues unabated along much of the Tanzanian coast including Tanga, Pangani, Bagamoyo, Temeke, Rufiji and Kilwa Districts. Data collected by Sea Sense Conservation Officers (Figure 3) shows that dynamite fishing occurred all year round, with a noticeable peak in November. This is most likely due to the calmer sea conditions during the north-east monsoon (Kaskazi) when the sea is clear and schools of fish can easily be seen.

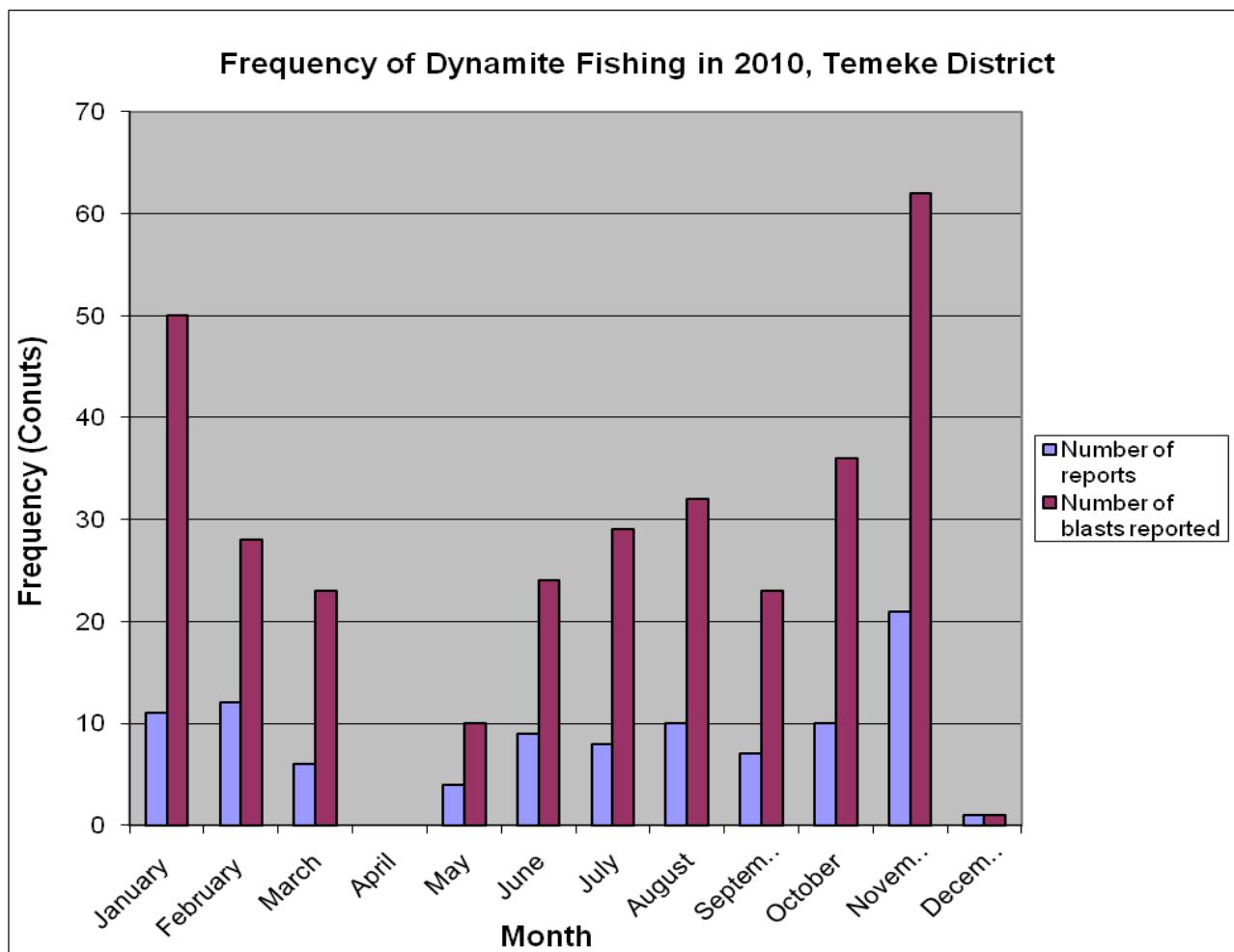


Figure 5: Seasonality of Dynamite Fishing Reports in Temeke District, 2010

Whilst most Sea Sense Conservation Officers continue to record dynamite fishing at many locations along the coast, a number of COs have ceased to record blasts due to increasing frustration at the lack of government action to curb dynamite fishing. They also report an increasing lack of willingness amongst other community members to cooperate with reporting networks due to the lack of action.

In March, Sea Sense together with WWF, gave an evening presentation at IST school in Dar es Salaam to raise awareness of current initiatives to curb dynamite fishing including ongoing recording and monitoring of dynamite blasts. Over 200 people attended and many offered their assistance in helping to monitor dynamite blasts. The event was also reported in several newspapers.

3.9 Scientific Symposia, Workshops and Meetings

3.9.1 International Sea Turtle Symposium

In April, the Sea Sense Coordinator gave an oral and poster presentation at the 30th International Sea Turtle Symposium in India. An oral presentation was given on sea turtle mortalities in Tanzania and a poster presentation detailing the illegal trade in sea turtle products in Tanzania.

The symposium is held each year and is an international gathering of 800-1000 of the world's foremost sea turtle scientists, conservationists, policy-makers and enthusiasts from more than 70 countries, and the only major conference of its type. The symposium was a valuable opportunity to publicise the progress being made in sea turtle conservation in Tanzania and network with colleagues from the region to discuss progress relating to the implementation of the Indian Ocean South East Asia (IOSEA) Marine Turtle Memorandum of Understanding of which Tanzania is a signatory state.

3.9.2 Dugong Bycatch Workshop

The Dugong MoU Secretariat convened a technical meeting for range states in the South West Indian Ocean (SWIO) in Madagascar in August. The overall objective of the meeting was to support and enhance cooperation to implement the Dugong Conservation and Management Plan in the SWIO region. 29 participants representing eight dugong range states from the East African coast and Western Indian Ocean Islands attended: Comoros, Kenya, Madagascar, Mayotte, Mozambique, Seychelles, Somalia and Tanzania. Tanzania was represented by the Sea Sense Coordinator together with two officials from the Ministry of Livestock Development and Fisheries.

Information exchange was a key objective of the workshop and there was strong agreement and commitment by all range states that a strategic sub-regional approach to dugong conservation and management was needed. A representative from each country gave a presentation on in-country dugong research, monitoring and management activities to provide a platform for collaboration.

One of the main focuses of the workshop was to discuss the use of a Standardised Dugong Catch/By-catch Survey Questionnaire and methodology in the SWIO region. A Technical Advisor to the MoU Secretariat provided information on the development and application of the survey questionnaire. Issues in relation to sampling protocols, data integrity and specific cultural or sensitive circumstances were also discussed.

There was strong interest and support from most range states to use the survey questionnaire to obtain additional data on dugong distribution, abundance and impacts. Each range state was invited to submit an application to the Secretariat for funds to implement the bycatch survey questionnaire.

Tanzania submitted an application through Sea Sense and the application was successful. Tanzania has been awarded \$6,000 to conduct bycatch assessments in Mkinga District, at the Kenyan border and in Mtwara District at the Mozambican border. Both of these areas have been dugong hotspots in the past but are both considered to be data deficient at present in relation to dugong distribution, abundance and level of bycatch. The surveys will be implemented in mid 2011.

3.9.3 SWIOFP Sea Turtle Training Workshop

In August, the Sea Sense Coordinator attended a sea turtle workshop in Reunion Island as part of the South West Indian Ocean Fisheries Project (SWIOFP). Technical specialists from each of the nine member countries of SWIOFP participated. Each participant provided an updated summary of the status of sea turtles in their country, with special emphasis on interactions with fisheries and regional cooperation. Technical training was then provided by five specialists from the region, to underscore the fundamental need for long-term monitoring and standardisation of protocols. Training modules included species identification, genetic analysis and satellite tracking.



Plate 12: Attaching a satellite tag to a loggerhead turtle

SWIOFP had originally agreed to fund the deployment of 10 satellite tags per country. However, due to budget shortfalls, this component of the sea turtle programme has been removed and Sea Sense is seeking other sources of funding to purchase the satellite tags.

3.9.4 First Signatory State Meeting of Dugong MoU

The first official Signatory State Meeting of the Memorandum of Understanding on the Conservation and Management of Dugongs and Their Habitats was held in Abu Dhabi, United Arab Emirates in October 2010. The meeting was organised by the office of the United Nations Environment Programme/Convention on the Conservation of Migratory Species of Wild Animals (UNEP/CMS). Governments, International and Non-Governmental Organisations as well as

experts from 30 countries attended. Tanzania is a signatory state to the Dugong MoU and was represented by two officials from the Ministry of Livestock Development and Fisheries and the Sea Sense Coordinator.



Plate 13: Delegates at the First Signatory State meeting for MoU on Dugong Conservation and Management

The purpose of the meeting was to add further range States as signatories, to update on activities undertaken so far and to discuss how best to advance implementation of the MoU and its associated Conservation and Management Plan. Presentations were given by experts on the global status of dugongs, dugong management tools including area closures and economic incentives and bycatch mitigation strategies.

The Sea Sense Coordinator gave a brief presentation on the success of cash incentives in marine endangered species conservation in Tanzania. Following the presentation, Professor Helene Marsh, who is widely regarded as the world's leading authority on dugongs, requested that Sea Sense dugong conservation initiatives be used as a case study in her forthcoming book.

The Secretariat announced that there would be a call for Expressions of Interest to take part in a pilot study to test financial tools for dugong conservation at relevant sites across the dugongs range. Tanzania will be submitting an application.

3.9.5 Tanzania Turtle & Dugong Conservation Committee (TTDCC)

To facilitate the implementation of the sea turtle and dugong MoU's in Tanzania, a national committee has been established comprising a number of institutions that have an interest in endangered marine species conservation. Representative institutions include:

- Fisheries Development Division (Chair & Secretary)
- Marine Parks & Reserves Unit (Treasurer)
- University of Dar es Salaam
- Tanzania Fisheries Research Institute

- Vice Presidents Office – Division of Environment
- Sea Sense (Co-chair)
- WWF

The overall objective of the Committee is to coordinate all national initiatives related to conservation and management of dugongs and sea turtles. The specific objectives of the Committee are:

1. *Improve coordination among government, non-government and private sectors in the conservation and management of dugongs and sea turtles and their habitat ;*
2. *Discuss, prioritize and develop areas for research and management;*
3. *Solicit for funds from government, development partners, NGOs for funding the approved research topics;*
4. *Provide technical advice to policy makers and other stakeholders with regard to conservation and management of dugongs and sea turtles*

A Terms of Reference is currently being drafted for the Committee and an official launch is planned for 2011. The committee worked together to develop the successful bid for funds to implement the dugong bycatch survey in Mkinga and Mtwara Districts and is now soliciting for funds for the development of a National Sea Turtle Action Plan.

3.9.6 2nd Workshop on Sea Turtle Conservation in Mozambique

In 2006, WWF Mozambique in collaboration with other partners organised the 1st Workshop on Marine Turtle Conservation in Mozambique to develop a strategy for sea turtle conservation. Several projects have already been implemented and a 2nd workshop was held in November 2010. The workshop reviewed the current state of research, monitoring and conservation of sea turtles in Mozambique and provided an opportunity for a wider integration within the WIO region of Mozambican sea turtle scientists as well as projects and activities.

The Sea Sense Coordinator attended the workshop and gave a presentation on the status of sea turtle conservation and management in Tanzania. Representatives from South Africa, Comoros and Reunion Island also presented country status reports. A plenary session was then held to discuss and collect inputs towards the Mozambique Marine Turtle Strategy and Action Plan 2012-2016.

4. Funding

4.1 RECOMAP

In November 10, Sea Sense completed all project activities funded by Recomap Call for Proposals 1. Funds were used to develop sea turtle ecotourism in Pangani and Temeke Districts over a two year period.

4.2 WWF

In July 2010, Sea Sense secured a further three years of funding from WWF to conduct endangered marine species work in Mafia, Rufiji and Kilwa Districts. Sea turtle work is focusing specifically on the development of sea turtle ecotourism in Mafia District and in Rufiji and Kilwa Districts the conservation of dugongs is being implemented through the Collaborative Fisheries Management Area process.

4.3 USAID

2010 saw the completion of the first year of funding from USAID to support sea turtle work in Pangani District which will continue until 2013. During year one of the project, Sea Sense monitored and protected sea turtle nests at four nesting beaches, developed a sea turtle ecotourism initiative and conducted a survey of sea turtle foraging grounds.

5. Problems Encountered

5.1 Continuation of Illegal Activities

Despite clear evidence and information provided by Sea Sense to national, district and village personnel, illegal activities including sea turtle slaughter, nest poaching, dynamite fishing, live coral mining and mangrove cutting continue.

The remains of slaughtered turtles are regularly found by COs in all Districts and sea turtle consumption is reported to be commonplace, particularly in migrant fisher camps. The sale of sea turtle meat appears to be a lucrative business and limited law enforcement allows offenders to operate with impunity. Sea Sense patrols to Shungmbili, Nyororo and Mbarakumi Islands in Mafia District uncovered large collections of sea turtle carapaces hidden in bushes together with large stores of illegal fishing gears such as monofilament nets. Seasonal fisher camps of up to 250 fishers were reported, many of whom admitted to be fishing without a licence or boat registration.



Plate 14: Migrant fisher camp in Nyororo Island, Mafia District

Sea Sense Conservation Officers are responsible for reporting cases of sea turtle slaughter to village leaders for action and on occasion leaders do respond and issue a penalty. In February, two green turtles were slaughtered near to Kungwi village in Mafia. The culprit was fined TSh 150,000. The fine will be distributed between the village council and Kungwi and Mkundini primary schools (TSh 50,000 each). However there is still conflict surrounding this case and the majority of the fine remains unpaid.

Dugong meat is also known to be sold and consumed illegally following incidental captures in gill nets. Despite ongoing awareness campaigns about the importance of dugong conservation and modest incentives offered to retrieve dugong specimens, local fishers in Bwejuu are known to have slaughtered and sold at least three dugongs in 2010. However, village leaders denied such activities and most fishers were unwilling to provide information due to the high price dugong meat can bring.

5.2 Limited Enforcement & Awareness

Despite clear conservation measures in Tanzanian legislation to protect endangered marine species, there is very limited enforcement by relevant government authorities. Offenders who deliberately hunt or poach turtle eggs, or who use destructive and illegal fishing practices such as dynamiting, are rarely issued with appropriate penalties in accordance with the law.

Limited awareness of the laws is also a major challenge. In 2010 Sea Sense made considerable effort to raise awareness of the revised 2009 Fisheries Regulations that have improved the level of protection for endangered marine species. Most coastal communities had no knowledge of the regulations. The new regulations are currently being translated into Kiswahili and upon completion, Sea Sense intends to produce some awareness materials for distribution in coastal communities.

6. Aims for 2011

- Continue conservation, endangered species protection and awareness raising in six coastal districts in Tanzania
- Expand sea turtle ecotourism in Mafia District
- Conduct a teacher training seminar in Pangani District
- Conduct dugong training workshops for CFMA members in Rufiji and Kilwa Districts
- Establish ecotourism revenue distribution scheme in Pangani District
- Conduct awareness campaign in Temeke District
- Conduct flipper tagging programme in Juani Island, Mafia District
- Satellite tag four nesting turtles in Mafia District
- Provide training to sea turtles monitors in Mnemba Lodge, Zanzibar
- Promote Sea Sense turtle adoption programme
- Attend 2011 Symposium on Sea Turtle Biology and Conservation in San Diego, USA
- Conduct fundraising campaign
- Conduct media campaign to promote the work of Sea Sense
- Improve Sea Sense data management and administration procedures

7. Immediate & Long Term Benefits

The immediate benefits from Sea Sense activities are:

- Protection of nesting sea turtles and their eggs from both human and non-human predators
- Protection of dugongs through the CFMA process and the implementation of the Dugong MoU
- Improved understanding of sea turtle biology through research programmes (tagging, DNA sampling)
- Enhanced capacity amongst local communities, government personnel and UDSM students through training and field work in marine conservation and sustainable resource use
- Improved local livelihoods through employment of community members (Conservation Officers & Tour Guides)
- Improved knowledge and awareness of the status, distribution and threats to marine species and habitats in Tanzania

Long-term benefits include:

- Development of ecotourism and generation of revenue through sea turtle adoptions and other income generating opportunities
- Improved understanding about marine conservation and sustainable resource use leading to wise use of resources in the future
- Improved population status of endangered sea turtles and other marine species in Tanzania
- Implementation of international sea turtle and dugong MoU's
- Improved knowledge amongst the scientific community of sea turtle conservation in Tanzania
- Improved reputation of Tanzania in relation to endangered marine species conservation

8. Acknowledgements

Sea Sense would like to thank all their donors, particularly Born Free, WWF, USAID and the EU RECOMAP programme for their continued funding and support. We would also like to acknowledge Amani Beach Hotel, Ras Kutani Lodge, Kasa Beach Hideaway, Chole Mjini, Shamba Kilole, Mafia Island Lodge, Mkoma Bay Tented Lodge and Kwa Don for raising money for Sea Sense and encouraging their guests to make donations. Thanks also to Dar es Salaam Charity Goat Races for providing a much needed back-up power supply to the Sea Sense office and IST and DIA schools in Dar es Salaam for their creative fundraising campaigns. Finally, our thanks to all our Conservation Officers, as well as the Village Chairpersons, Council members and Environment Committees for helping to protect endangered marine life in Tanzania.

Appendix I: Results of Activities Implemented by Sea Sense in 2010

Activities	Results / Achievements	Remarks
1. Flagship species data collection	<ul style="list-style-type: none"> • Number of turtle nests recorded: 497 • Five turtles tagged in Temeke and one in Mafia • Number of live dugong sightings: 6 • Many humpback whales sighted off the Tanzanian coast between July and December 	<ul style="list-style-type: none"> • 497 nests were laid by green turtles (<i>Chelonia mydas</i>), peaking in May • Dugong sightings in Mafia and Rufiji Districts
2. Turtle nest monitoring and protection	<ul style="list-style-type: none"> • Number of nests hatched successfully: 466 • Number of hatchlings: 40,264 (success rate: 71.54%) • Number of nests predicated / partially predicated: 13 • Number of nests poached: 6 • Number of nests inundated: 7 • Number of nests rotted: 5 • Turtle ecotourism developed in Mafia, Temeke & Pangani Districts • Village Community Fund in Amani Gomvu village (Temeke) and Juani village (Mafia) receiving funds from turtle ecotourism 	<p>The predicated nests were eaten by red ants, monitor lizards, honey badgers and mongooses. Efforts were made to protect nests from predation through translocation and netting.</p>
3. Mortality analysis for flagship species	<ul style="list-style-type: none"> • Number of turtle mortalities recorded: 64 • Of these, 52 were green turtles and 5 	<ul style="list-style-type: none"> • Average CCL of 60.7cm • Average CCW of 53.8cm • 55% of mortalities were female

	<p>were hawksbill, three were olive ridley and four were unidentified</p> <ul style="list-style-type: none"> • Average CCL was 67.7 cm ($SD \pm 23.1$) • Number of dead dugongs reported: 4 • Number of dead cetaceans recorded: 4 	<ul style="list-style-type: none"> • 70% of sea turtle mortalities were female; 8% were male; 22% were unidentified • Dugong mother / calf pair drowned
4. Sea Turtle Ecotourism	<ul style="list-style-type: none"> • Ecotourism developed in Mafia, Temeke and Pangani Districts • Six Tour Guides recruited in Mafia and Temeke Districts • Two access routes to nesting beaches cleared in Juani Island • Revenue collection system established in Mafia and Temeke Districts • Over \$3,500 raised • Partnership formed with safari operator in DSM • 35 sea turtle nests adopted, raising \$1,750 	
5. Surveys	<ul style="list-style-type: none"> • Endangered species bycatch survey in three villages in Pangani District • Survey of sea turtle foraging grounds in Pangani District • Assessment of environmental knowledge in secondary schools • Assessment of knowledge and understanding amongst BMU members in Temeke District 	<p>Surveys revealed</p> <ul style="list-style-type: none"> - Gill nets pose biggest threat to sea turtles and other endangered marine species - Captured turtles often eaten or sold - Area around Maziwe and Zinga Islands in Pangani District are important foraging grounds for green and hawksbill turtles - Low level of knowledge of marine

		issues amongst teachers and pupils in Temeke District
6. Recruitment & Training	<ul style="list-style-type: none"> • Central Coordinating Committee of two CFMA's trained in dugong conservation in Rufiji and Kilwa Districts • Six Tour Guides recruited and trained in Mafia and Temeke Districts • Four students from the University of Dar es Salaam trained in office administration and field research • 40 women trained in handicrafts production in Mafia District • Eight Conservation Officers complete English language training in Temeke District 	<ul style="list-style-type: none"> • CFMA training included: dugong biology & life history, global status, threats to survival • Tour Guide Training included: biology of sea turtles, threats to survival, ecotourism principles, visitor management
7. Dynamite Fishing	<ul style="list-style-type: none"> • Blasts recorded by CO's in Temeke Distirct • Noticeable peak in November • Presentation given at IST school 	<ul style="list-style-type: none"> • Despite many anti-dynamiting initiatives, the practice persists along much of the Tanzanian coast • Village leaders agree that dynamite fishing is the most threatening fishing practice in Temeke District. Main reason given for the persistence of dynamite fishing is limited or lack of law enforcement. Many villagers complain that fishers caught with dynamite or dynamited fish are released after a

		<p>few days, contrary to Fisheries laws.</p> <ul style="list-style-type: none">• Many CO's refused to collect dynamite fishing data due to lack of action from authorities
8. Education and Awareness	<ul style="list-style-type: none">• World Environment Day celebrated in Pangani District• Village meetings held in eight coastal Districts• Beach clean-ups completed in collaboration with schools in DSM• Six magazine articles and press releases published• Presentations given at IST & DIA schools, UDSM and at Dar es Salaam Yacht Club• Sea Sense stand at Dar es Salaam Charity Goat Races• Community & Service programme implemented with DIA students• Sea Sense filmed for international documentary on marine resource management	<ul style="list-style-type: none">• Set of recommendations produced from whale shark awareness meetings• Several hundred people attended each showing of marine conservation DVD's.
9. Regional and International Workshops and Meetings	<ul style="list-style-type: none">• Two papers presented at International Sea Turtle Symposium• Participation in SWIO Dugong Bycatch workshop• Attendance at satellite tagging	

	<p>workshop under SWIOFP programme</p> <ul style="list-style-type: none">• Attendance at 1st Signatory State meeting of Dugong MoU• Participation in sea turtle workshop in Mozambique	
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