United Republic of Tanzania

GENERAL INFORMATION

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OBJECTIVE I. REDUCE DIRECT AND INDIRECT CAUSES OF MARINE TURTLE MORTALITY

1.1 Introduction to marine turtle populations and habitats, challenges and conservation efforts. [INF]

Tanzania's mainland coastline, together with Zanzibar and numerous smaller offshore islands, provides important feeding and breeding habitats for five of the world's seven marine turtle species: leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*) and olive ridley (*Lepidochelys olivacea*) turtles. Green turtles are the most common species and are reported to nest throughout most of the coastline. Hawksbills are also widely distributed in Tanzania but are only known to nest in small numbers on off-shore islands. Very little information is available on olive ridley, loggerhead and leatherback turtles although they are thought to forage in Tanzanian waters and pass through en route to nesting sites elsewhere in the region.

The status of marine turtles in Tanzania was first assessed in the mid-1970s when populations of all species were reported

to be declining. Although afforded complete protection under national fisheries legislation, marine turtle populations in mainland Tanzania continue to face threats from subsistence harvesting for meat, poaching of eggs, incidental capture in gill nets and habitat disturbance (Bourjea et al., 2008). Inshore commercial prawn trawlers also pose a significant threat (Joynson-Hicks & Ngatunga, 2009) although the commercial prawn trawl industry has been closed since 2008. Tourism development leading to destruction of nesting beaches is a major concern for marine turtle populations in Zanzibar (Bourjea et al., 2008).

Since the early 1990s, marine turtle conservation initiatives have been implemented at all major nesting sites in the country. However, information concerning marine turtle habitats, population dynamics and levels of threat is incomplete.

Green Turtle:
The green turtle is the most common nesting species in Tanzania. The most concentrated nesting occurs in Mafia Island although there are also important nesting sites in Temeke, Pangani and Mtwara Districts and in Mnemba Island, Zanzibar. Nesting also occurs in Mkuranga, Rufiji and Kilwa Districts although nesting density is very low in these areas (less than 10 nests recorded per year). Surveys conducted in 2012 and 2013 indicate that green turtles also nest in Lindi and Mkinga Districts although these sites are not routinely monitored due to funding and resource limitations. Green turtles nest all year round in Tanzania although there is a well defined peak in April and May.

Population size estimates from the mid-1970s put the total number of green turtles nesting in the whole of Tanzania at approximately 300 (Frazier, 1976). In order to gain an up to date picture of the size of the nesting population and determine whether nesting populations have declined since the estimate made more than 30 years ago, a saturation tagging programme was implemented in 2012 in Mafia Island. A second tagging programme was implemented in Temeke District in 2013. Preliminary analyses of results indicate that the nesting population is smaller than originally thought.

Hawksbill turtle:
Hawksbill turtles are also widely distributed but are less abundant. There are no records of hawksbill turtles nesting along the mainland coast of Tanzania. All recorded nests have been on small, offshore islands such as Misali Island in Pemba, Mnemba Island in Zanzibar, Shungi-mbili Island and Juani Island in Mafia and the Songo Songo archipelago.

The most important nesting sites in Tanzania are Misali Island, Pemba and Mafia Island. On Misali Island, 42 hawksbill nests were recorded between 1998 and 2002, peaking during the month of March, while on Mafia Island, 37 hawksbill nests were recorded between 2001 and 2013, of which 27 were laid on the east coast at Juani and Kungwi, 3 on the west coast at Mlongo and Jojo and 7 were laid on Shungi-mbili Island off the north west coast of Mafia. It is likely that some hawksbill nests go unrecorded due to the inaccessibility of some of these islands at certain times of the year. The main nesting season is during the northeast monsoon between December and April.

Olive Ridley turtle:
Little is known about the status of olive ridley turtles in Tanzania although they are no longer reported to nest. They were observed nesting on Maziwe Island south of Tanga in the mid-1970s but the island has subsequently submerged and no further nesting records for this species have been made anywhere on the Tanzanian mainland or on offshore islands. (Muir 2005b). Local fishers note that they are occasionally accidentally caught in gillnets along the Tanzania coast and net captures have been confirmed in Mtwara, near the border with Mozambique. These net captures were confirmed in MBREMP in 2003 when several dead animals were photographed. Between 2004 and 2013, 63 Olive ridley strandings were recorded along the Tanzanian coast in Rufiji, Pangani and Temeke Districts.

Loggerhead turtle:
Loggerhead turtles are relatively rare in Tanzania and there is no indication that they nest. However, evidence from tag returns of individuals caught in nets off Mtwara and Mafia indicate that southern Tanzania and the Mafia area are important foraging grounds for loggerheads nesting in Tongaland and Natal, South Africa. Three tagged animals were caught in southern Tanzania in 1976. One animal swam a distance of at least 2,640km in 66 days between its release in Natal and its capture at Kilwa Masoko and a second animal accomplished a similar feat (Frazier 1976). Since 2001, tags have been recovered by Sea Sense from 6 loggerhead turtles caught in gillnets: 2 at Jibondo Island off southeast Mafia, 3 off Songo Songo Island and 1 in Pangani District. All were tagged while nesting in Tongaland and Natal in South Africa (Muir 2003). During a prawn trawl bycatch survey in 2007, a loggerhead was caught and recorded in a net (Muir and Ngatunga, 2009).

Between 2004 and 2013, 21 loggerhead strandings were recorded along the Tanzanian coast in Rufiji, Pangani and Temeke Districts. Leatherback turtle:
Very little information is available on leatherback turtles in Tanzania because they are so rarely sighted and because indigenous knowledge is limited. Although the leatherback was noted as nesting in Zanzibar in the 1970s (Frazier 1976),

there have been no further records of this species nesting in Tanzania. In 1997/1998, five leatherback turtles, mostly dead individuals, were recorded from Unguja Island (Khatib 1998). Occasional net captures and opportunistic sightings of leatherback turtles also indicate that this species forages in Tanzanian waters. Two leatherback turtles were caught in offshore waters on Pemba Island in 1997 (Slade et al. 1997). Three individuals were washed up on Mafia beaches in 2002 and 2003 (C Muir, *pers. obs.*) and another was released by fishers from a net in Kilwa in 2010 (L West, *pers comms.*). This suggests that they may feed in the area or are migrating to nesting sites in Natal.

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Foraging grounds: Tanzania harbours extensive seagrass beds and coral reefs which can support considerable numbers of marine turtles (Howell and Mbindo 1996). Seagrass beds are found in abundance in sheltered areas of the coast around Moa in Tanga and tidal zones fronting the deltas of the Ruvu, Wami and Rufiji rivers although the actual area covered by seagrass beds and the relative species densities have not been established in Tanzania.

The extensive seagrass beds off the southern Rufiji Delta (Kichinja Mbuzi and Toshi), including Mohoro Bay (Fungu ya Kasa), are reported by local residents to be important feeding grounds for green turtles. This has been confirmed by regional satellite telemetry projects which identified the Rufiji Delta as one of only five regional 'hot spots' for green turtle foraging activity and serving as an important migratory corridor for green turtles nesting elsewhere in the SWIO region (Bourjea et al 2013). International flipper tag recoveries also show that green turtles from Seychelles, Mayotte and Comoros frequently migrate to and forage along the central Tanzanian coast.

In Mafia Island, adult green and hawksbill turtles are seen regularly by recreational divers in Chole Bay and along the east coast of Juani Island where seagrass and corals occur. Off Ras Kisimani on the west coast of Mafia, green turtles have been observed digging pits in the sand at a depth of 10-15 meters where they appear to rest (Muir 2005b). These areas are within the boundaries of Mafia Island Marine Park.

In Mtwara, records of green and hawksbill turtle sightings from dive surveys and questionnaire surveys indicate that important marine turtle foraging habitats exist in Mnazi Bay and off Msimbati (Guard et al. 1998; Muir 2003).

In Zanzibar, green and hawksbill turtles are regularly sighted by divers at Nungwi and the coral reefs around Mnemba Island. The reefs off Zanzibar are also reported to be important feeding grounds for loggerhead and leatherback turtles (Khatib et al. 1996).

Developmental grounds: Stranding data indicates that Tanzanian coastal waters provide developmental grounds for juvenile green turtles, particularly in Temeke and Rufiji Districts where more than 80% of annual green turtle strandings are of juveniles and sub-adults.

In Zanzibar, the main marine turtle developmental habitat, where small and immature green and hawksbill turtles concentrate, is reported to be in Uroa in the Central District of Unguja. The area comprises seagrasses, corals and algae (Khatib et al. 1996).

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Some of the most important causes of marine turtle mortality in Tanzania include: incidental capture in gillnets from inshore artisanal fisheries, subsistence harvesting of nesting and foraging turtles and their eggs, disturbance of nesting beaches from tourism development (coastal development), human disturbances and light pollution on nesting beaches (by tourists, seasonal fisher camps), pollution (including sewage, chemical pollutants and plastic / macrodebris), and damage to seagrass and coral reef habitat from destructive fishing gears such as seine nets and dynamiting; lack of law enforcement; and non-human predation (Thiagarajan 1991; Clark and Khatib 1993; Slade 2000; Muir 2005b; Muir 2007b).

Habitat destruction caused by erosion, in some cases the result of coastal developments, live coral mining and clearing of mangroves also threatens marine turtles (Khatib 1998; Muir 2007b). The threat of erosion is illustrated by the case of Maziwe Island which submerged in the 1980s. In Zanzibar, a study commissioned by the Department of Environment, indicates that the coastline is being eroded at a rate of 1-3 meters a year. The areas most threatened in Unguja include Nungwi, Bwejuu, Jambiani and Mnemba Island (Khatib 1998). Since 2001, the island of Shungi-mbili has been severely eroded, partly from natural causes and partly due to felling of vegetation by fishermen to supply firewood and to cure sea cucumbers. This has led to the creation of very steep beach walls which marine turtles have difficulty climbing to nest, and an increase in the general level of activity on the island with reduced space available for fishers to camp. This has resulted in a reduction in the number of marine turtles that nest on Shungi-mbili Island, and those that do, typically lay their eggs

below the sand wall where the eggs are inundated (Muir 2005b).

Tanzania has a network of Marine Protected Areas including three Marine Parks and several smaller Marine Reserves. The country also has legislation in place that provides protection to marine turtles and their habitats. However weak law enforcement and limited awareness in coastal communities is hampering the effective protection of marine turtles in Tanzania.

1.2.1 Describe any protocol or approaches practiced in your country, which you consider exemplary, for minimising threats to marine turtle populations and their habitats, which may be suitable for adaptation and adoption elsewhere. [BPR]

Reduction of egg harvesting:

Traditionally, marine turtle egg collection has been ubiquitous along the Tanzanian coast, and, unlike the killing of turtles themselves, is not generally perceived to be contravening the law. Evidence of egg collection has been observed in all coastal districts.

However, at sites in coastal districts where effective community beach monitoring and conservation education are underway, the threat of egg harvesting has been significantly reduced. In Mafia Island for example, 49% of nests recorded during the first year of monitoring by Sea Sense NGO (2001) were poached by local fishers (Muir 2005b). However, in 2002, following the implementation of beach patrols, the introduction of a nest protection incentive scheme and a public awareness campaign, the incidence of poaching fell to 8% and declined further to less than 1% in 2003 and 2004 (Muir 2004). The rate of nest poaching has remained at less than 2% since then. A similar change in behaviour has been recorded in MBREMP where the number of nests poached fell from 100% in 2003 to 0% in 2004 following initiation of a marine turtle conservation programme (Mahenge 2004). In Temeke District, since monitoring began in July 2004, less than 2% of nests (18 out of 950 nests recorded) have been poached.

Community members who find and report a nest are given a small financial incentive. Further payment is given for every egg that hatches successfully (total of approx $13 per nest).

Monitoring programme:

In January 2001, Sea Sense NGO implemented a community-based marine conservation initiative in Mafia District (Mafia Island) to promote the long-term survival of endangered marine species and habitats, in collaboration with Mafia District Council, Mafia Island Marine Park and local communities. Direct conservation, nest monitoring, flipper tagging, public awareness, training and research are undertaken by a team of village-elected 'Conservation Officers'. A nest protection incentive scheme was initiated in 2002. Under this scheme, individuals who report a nest receive an initial reward of USD$3 once the nest is verified. They assist the turtle monitor in protecting the nest from human and non-human predators during the incubation period and are rewarded with a second payment of USD 0.40 for every successful hatchling and USD 0.20 for every rotten egg.

In 2004, activities were scaled up to the mainland coast and now marine turtle conservation programmes exist in Temeke, Mkuranga, Kilwa, Rufiji, Mafia and Pangani Districts with the assistance of 33 community Conservation Officers.

Involvement of local communities in nest protection, monitoring, data collection and awareness raising has played a key role in reducing threats to marine turtles but there are risks associated with incentive-driven conservation, the most important of which is financial sustainability. However, in areas where mortality (through turtle and egg poaching) had reached critical levels, financial rewards were a realistic solution. In Zanzibar, cash incentives have been found to be counter-productive to obtaining committed public participation (Khatib et al. 1996).

A longer term and more sustainable marine turtle conservation initiative has been implemented at the three largest nesting sites in mainland Tanzania in the form of marine turtle ecotourism. Visitors are guided to nesting beaches by trained 'Community Turtle Tour Guides' and are able to witness hatchlings emerging from their nest for the first time. Visitors pay a small fee to participate in marine turtle ecotourism, half of which is retained by Sea Sense to support marine turtle conservation efforts and the other half is donated to communities living near to the nesting beaches to support community development projects. Marine turtle ecotourism has provided economic benefits to coastal communities and helped to change attitudes towards marine turtle conservation.

Collaborative Fisheries Management Areas (CFMAs):

CFMAs have been implemented in several coastal districts whereby geographical coastal and marine areas are designated for local management using legislative and administrative processes. CFMA's are intended to protect, conserve, manage and develop a variety of fishery resources and encourage their wise use. They are identified, planned and established through Beach Management Units (BMUs) in Tanzania's coastal fishing communities. Area management plans have been developed in consultation with the Fisheries Development Division, Local Government, District Authorities, BMUs, NGOs and the wider fishing community.

As a direct result of CFMA's, the incidence of illegal fishing has reduced in some areas. Boundary conflicts have been resolved and revenue collection systems have been improved. Conservation and protection measures for endangered marine species, including marine turtles have also been incorporated into a number of action plans. Temporary (two years) and spatial closures of four reefs supporting foraging populations of marine turtles were approved in May 2010 by CFMAs in Rufiji and Kilwa Districts.

Based on the negative perception which existed in many coastal communities prior to CFMA implementation, initiation of reef closures is a significant success and will contribute to the regeneration of critical habitat and help to reduce mortality from gill net bycatch.

Predator control

In 2008, due to high levels of predation by digging mammals in Temeke District, protective nets were placed over several nests using techniques described in Boulon, Jr, 1999. Such strategies have proven reasonably effective in deterring some predators. 16% of nests in Temeke District were predated in 2013 compared with 29% in 2007. However, predation by ants (Solenopsis spp) remains an ongoing problem due to the ants' ability to establish underground trails to turtle nests (Buhlmann & Coffman, 2001).

1.3.1 Describe any socio-economic studies or activities that have been conducted among communities that interact with marine turtles and their habitats. [BPR, INF]

Surveys to assess the trade in marine turtle products were conducted at Dar es Salaam fish markets in 2008 and 2009. Results showed that marine turtle carapaces, meat and oil were readily available although trade took place in secret.

In 2008 a survey was conducted in 10 coastal villages (252 respondents) in mainland Tanzania to assess the level of turtle meat consumption. 50% of respondents admitted to eating turtle meat on a regular basis.

A number of other studies to address resource-use by coastal communities, the economic value of marine turtle products and the cultural / social implications of human-turtle interactions have been conducted:

Clark, F. 1992. Pemba sea turtle survey: report on pre-survey training workshop for village contacts.

Clark, F. and Khatib, A.A. 1993. Sea turtles in Zanzibar: status, distribution, management options and local perspectives. Zanzibar Environmental Study Series No. 15b. The Commission for Lands and Environment, Zanzibar.

Darwall, W.R.T. 1996. Marine biological and marine resource use surveys in the Songo Songo archipelago, Tanzania. Report no. 3: Simaya Island. The Society for Environmental Exploration and the University of Dar es Salaam.

Darwall, W.R.T. and Choiseul, VM. 1996. Marine biological and marine resource use surveys in the Songo Songo archipelago, Tanzania. Report no. 4: Okuza Island. The Society for Environmental Exploration and the University of Dar es Salaam.

Mack, D., Duplaix, N. and Wells, S. 1995. Sea turtles, animals of divisible parts: international trade in sea turtle products. In: K A Bjorndal (Ed), Biology and Conservation of Sea Turtles, Revised Edition. Smithsonian Institution Press, Washington DC. 619 pp.

Muir, C.E. 2005b. The status of marine turtles in the United Republic of Tanzania, East Africa. Sea Sense Report (Tanzania Turtle and Dugong Conservation Programme).

Muir, C.E. 2007a. Sea Sense Technical Report: June 2007. 1-9 p.

Muir, C.E. 2007b. Community-based endangered marine species conservation: Tanzania.

Ngusaru, A.S., Tobey, J. and Luhikula, G. 2001. Tanzania State of the Coast 2001: People and the Environment. Tanzania Coastal Management Partnership, Science and Technical Working Group, Dar es Salaam.

Semesi, A.K., Mgaya, Y., Muruke, M.H.S., Francis, J., Mtolera, M. and Msumi, G. 1998. Coastal resources utlisation issues in Bagamoyo, Tanzania. Ambio, 27: 635-644.

Tanzania Coastal Management Partnership. 2003. Tanzania: State of the coast: The national ICM strategy and prospects for poverty reduction.

1.3.2 Which of these adverse economic incentives are underlying threats to marine turtles in your country? [TSH]

- ■ **High prices earned from turtle products relative to other commodities**
- ☐ Lack of affordable alternatives to turtle products
- ■ **Ease of access to the turtle resource (eg. by virtue of proximity or ease of land/water access)**
- ☐ Low cost of land near nesting beaches
- ☐ Low penalties against illegal harvesting
- ☐ Other1:
- ☐ Other2:
- ☐ Other3:
- ☐ None of the above or Not Applicable

Marine turtle meat and oil is easily accessible in coastal communities and fetches a slightly higher price than fish protein and oil. However, turtle soup, also readily available, is sold cheaply.

There are high penalties for illegal harvesting but the penalties are rarely enforced.

1.3.3 Has your country has taken any measures to try to correct these adverse economic incentives? [BPR]

■ YES ☐ NO ☐ NOT APPLICABLE (no adverse economic incentives exist)

Targeted sensitisation activities have been carried out with buyers and traders in marine turtle meat in Kilwa District where turtle meat consumption is widespread. The awareness campaign has reduced the trade in marine turtle meat.

In early 2014, Sea Sense NGO conducted a two day marine legislation seminar with law enforcers and the judiciary in Tanga Region to sensitise officials on the laws and penalties associated with illegal harvesting of marine turtles. Funds have already been secured to repeat the seminars in three other coastal districts.

1.4.1 Indicate, and describe in more detail, the main fisheries occurring in the waters of your country, as well as any high seas fisheries in which flag vessels of your country participate, that could possibly interact with marine turtles. [INF]

a) Shrimp trawls: ■ YES ☐ NO

Commercial trawling started in Tanzania in the late 1960s and, by around 2005, a maximum of 25 vessels operated along the coast in 3 zones (Muir 2005b; Muir 2006 unpublished). The prawn trawling season is open for 8 months of the year between April and November (inclusive; Richmond et al. 2002). Apart from several exclusion areas in Tanga region, trawling is unrestricted. Prawn hotspots exist at Mchungu and Jaja off the Rufiji delta and at times when good prawn concentrations are found, a maximum of 14 vessels might be fishing this area (Muir 2005b).

Industrial prawn trawl fishing started in Tanzania in 1988 at which time there were 13 licensed vessels. In 1995, the fishing effort rose to 18 vessels and continued to increase to 25 vessels in 2003/4 with catches fluctuating between 688mt to 1,320.1mt (Tanzania Fisheries Research Institute, 2006). Studies of prawn exploitation in Tanzania indicated that there had been a significant reduction in biomass and yields since 1992 (Sanders, 1989; Nhwani et al 1993; Bwathondi et al., 2001) and that the fishery was being overexploited. Consequently, in 2001 it was recommended that the number of vessels licensed to trawl in Tanzania be reduced from 20 to eight. In 2006, 13 licensed prawn trawlers were operating in Tanzania (Anon. 2006) and in 2007 there were ten. .

Zonation along the coast helps to distribute fishing pressure. There are three Zones: Zone 1 from the Kenya border to Bagamoyo; Zone 2 from Temeke to the Rufiji Delta; and Zone 3 from the Rufiji Delta to Mtwara. The most productive area for prawns is at the boundary of Zones 2 and 3 off the Rufiji Delta.

Trawling vessels focus efforts in shallow estuarine environments during the season which runs from 01 April to 30 October. However, in 2007, the season did not start until June due to a paucity of prawns during the previous three years. Vessels are foreign owned, but must be registered in Tanzania where they are licensed to access territorial waters and land catch. Prawn hotspots exist at Mchungu and Jaja off the Rufiji Delta and at times when good prawn concentrations are found, a maximum of 14 vessels might be fishing this area (Muir 2005). Tanzanian prawns are sold in Europe.

A survey of the Tanzanian industrial prawn trawl fishery was conducted between June and September 2007 to determine the level of incidental capture of marine turtles and mammals (Joynson-Hicks & Ngatunga, 2009). Trained observers from the Tanzania Fisheries Research Institute (TAFIRI) and the Prawn Trawl Association assisted with data collection. Data were collected from six vessels in each of the three fishing zones. The average number of fishing days per month was 26 with each vessel pulling a maximum of four hauls a day for a soak time of 2.5 to 3 hours. 16 turtles were caught in five of the vessels. Three species were caught: green (62.5% of total), hawksbill (19% of total) and loggerhead (12.5% of total). Most were caught in Zones 1 and 2 during August. With a fleet of ten vessels (the number licensed in 2007) it is estimated that 54 turtles are caught annually. The size of the turtles captured ranged from 43 to 120 cm curved carapace length (CCL). The average turtle carapace length was 70.87cm (SD +/- 24). Both sub-adults (CCL 35 – 75cm) and adults (>75cm) were caught but most captures were of sub-adults (69%). Both male and female turtles were recorded including an adult green female who may have been offshore prior to nesting.

Only two species, green and hawksbill, nest in Tanzania. The population of nesting hawksbill turtles is small (<10 a year) and they tend to nest on small offshore islands rather than on the mainland beaches between November and March during the north-east monsoon. This corresponds to the closed prawn trawl season. Conversely, green turtles nest in greater numbers (approx 300 a year) both on the mainland and islands throughout the year peaking in April and May when the prawn trawl season is open. This indicates that reproductive green turtles are more threatened by this fishery than hawksbills. In 2007 the season did not open until June and therefore it was not possible to establish whether greater numbers of turtles are caught during the peak reproductive season when they congregate offshore to mate.

In January 2008, the Tanzania Prawn Trawl Association proposed a closure of the industrial prawn trawl fishery for two years between 2008 and 2010 due to declining prawn yields, destruction of the benthic environment and to allow research on maximum sustainable yields to be carried out. The closure has since been extended and remains closed today (2014).

b) Set gill nets: ■ YES ☐ NO

Gillnets, with a mesh size of 5-6 inches (about 18 cm; local name: soni) are used to target catfish, emperor fish, grouper, parrot fish and trevally. Gillnets with a mesh size of 10+ inches (36 cm; local name: sinia) target sharks and rays (Berachi, 2003). Both types of gill net pose a threat to all species and age classes of marine turtle in Tanzania (Thiagarajan, 1991) although nets with a larger mesh size pose a more serious threat. Most captures are incidental. However, at some known foraging grounds, nets have been set deliberately to catch turtles (Slade 2000). Targeted marine turtle fisheries exist in Mtwara, Lindi and Kilwa Districts.

In 2007, a sea turtle bycatch survey was conducted at eight fish landing sites in five coastal districts in 2007 (Muir & Ngatunga, 2007). 144 interviews were conducted with gill net fishers. All reported to use locally-crafted wooden sailing boats (mashua) measuring between 5 – 9 meters in length. Few had outboard engines. The average crew size for the gillnet fishery was between four to six fishermen and nets ranged in length from 100m up to 1,800m. Gillnet fishers tended to fish during neap tides when the current was not so strong, fishing between six and 20 days a month. The nets were typically set in the evening and pulled 12 to 24 hours later at depths of between 10m and 40m.

At all sites except Nyamisati in Rufiji, gillnet fishers reported that they fished throughout the year, with greater intensity during the SE monsoon. Gillnet fishers from Nyamisati said that they fished between May and October.

Of the 144 gillnet fishers interviewed, 49 (34%) admitted to having caught a turtle in their net. Reported turtle captures were spatially uniform except at Nyamisati where none were reported. This is as expected as Nyamisati village is situated in the Rufiji Delta mouth where there is a heavy sediment load, fresh water and extensive mangrove forests, not suitable for nesting or foraging turtles. The main seagrass beds in the delta area are to the south near to Somanga where both marine turtles and dugongs were reported to get caught in nets.

A survey of gillnet fishers in Mkuranga District in 2008, indicated high levels of marine turtle bycatch. 48 fishers participated in the survey, of which 39 regularly used gill nets, mostly bottom set. Nets ranged from 5m to 700 m in length. 77% (n: 30) of the gill net fishers reported catching sea turtles on a monthly basis. Almost all (n: 28) were using sinia with a mesh size of 10 – 12 inches.

Analysis of marine turtle stranding data for the period 2004 – 2013 shows that over 80% of recorded mortalities were green turtles. The mean, minimum and maximum curved carapace length (CCL) was 64cm (SD +/- 24), 5.5cm and 148cm respectively. More than 80% had a CCL measuring less than 95cm, which is the average green turtle CCL at sexual maturity. This suggests that Tanzanian waters pose a significant threat to juvenile and sub-adult green turtles and gill net bycatch is the most likely cause of death.

Most of the strandings are green turtles, but hawksbill, loggerhead and olive ridley are also occasionally recorded (St John & Muir, 2006). Many carcasses have head wounds caused by release from fishing nets and many show evidence of net damage around the neck and flippers suggesting incidental capture in gillnets rather than prawn trawlers or other fishing gears.

Temeke District, south of Dar es Salaam has the highest recorded rate of marine turtle mortalities in Tanzania with an average of 195 dead turtles stranded along a 60km stretch of coast annually. The area is a key breeding and nesting site for green turtles and hence there are a high number of turtles in inshore waters exposed to harmful fishing gears.

c) Anchored Fish Aggregating Devices (FADs):

d) Purse seine (with or without FADs): ■ YES ☐ NO

A Marine Fisheries Frame Survey undertaken by the Ministry of Livestock and Fisheries Development (mainland) and Ministry of Agriculture, Livestock and Environment (Zanzibar) in 2007 reported 578 purse seines operating in Tanzanian waters.

There is no data available regarding the level of interaction between marine turtles and these fishing gears in Tanzanian waters or the potential impact on marine turtle survival.

e) Longline (shallow or deepset): ■ YES ☐ NO

A Marine Fisheries Frame Survey undertaken by the Ministry of Livestock and Fisheries Development (mainland) and Ministry of Agriculture, Livestock and Environment (Zanzibar) in 2007 reported 2,975 long liners operating in Tanzanian waters which increased to 9,437 in 2009.

There is no data available regarding the level of interaction between marine turtles and these fishing gears in Tanzanian waters or the potential impact on marine turtle survival.

f) Driftnet: ☐ YES ■ NO

g) Other1:

The artisanal fishery sector is the most important in Tanzania, providing the economic base for the majority of coastal communities. Most reef fish, sardines and other species are caught for domestic markets. The main artisanal gears are: shark nets, long lines, hand lines, traps, ring nets and scoop nets. Catches are composed mainly of: sardines, anchovies, mackerel, kingfish, emperor, grouper, snapper, sharks, rays, shrimp, lobster and sea cucumber.

The artisanal fishing industry has grown significantly in recent years. Between 2005 and 2007, the number of fishers increased from 29,754 to 36,247 with a concurrent increase in the number of fishing vessels from 7,190 to 7,342. There has been a continuous increase of unregistered fishing vessels. 68% of all fishing vessels were not registered in 2007 while in 2009 the figure increased to 73%.

During a survey of artisanal fishers in 2007, 49 (18%) respondents reported catching marine turtles in their nets (Muir & Ngatunga, 2007). Of these, 45 (92%) were gillnet fishers, mostly using the smaller 5-6 inch mesh net. Of the others, three used hand lines and one a ring net. Most (n: 23) reported captures were of green turtles. Hawksbill, loggerhead and olive ridley species were also mentioned but leatherbacks were not. Most fishers (n: 36; 73%) reported that when they catch a turtle in their net they release it unharmed. Only ten admitted to killing and eating / selling turtles they captured and one said he would report any capture to the local Fisheries Officer.

All the respondents reported that they catch on average between one and ten marine turtles a year, during both the hotter calmer months of the NE monsoon (November to March) and the cooler months of the SE monsoon (July – Sept). Only eight respondents claimed to catch more than ten turtles in a year.

h) Other2:

The number of spear guns (and snorkelling gear) in use has increased in recent years due to a programme by IFAD enabling fisherman to purchase fishing gear on credit (Thiagarajan 1991; Slade 2000). This is thought to be responsible for increases in marine turtle catches in Zanzibar (Clark and Khatib 1993; Slade 2000).

☐ **None of the above**

1.4.2 Please indicate the relative level of fishing effort and perceived impact of each of the above fisheries on marine turtles (e.g. in terms of by-catch). [TSH]

a) Shrimp trawls

Fishing effort:

☐ RELATIVELY HIGH ☐ MODERATE ☐ RELATIVELY LOW ■ **NONE** ☐ UNKNOWN

Perceived Impact:

☐ RELATIVELY HIGH ☐ MODERATE ☐ RELATIVELY LOW ■ **NONE** ☐ UNKNOWN

Source: The industrial prawn trawling industry has been closed since 2008.

b) Set gill nets

Fishing effort:

■ **RELATIVELY HIGH** ☐ MODERATE ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Perceived Impact:

■ **RELATIVELY HIGH** ☐ MODERATE ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Source: Gillnets pose a major threat to all species of marine turtle (adult and subadult) in Tanzania. Most captures are incidental (Muir 2005b). However, at some locations, nets are set deliberately to catch marine turtles. Such sites include Mtwara, Kilwa and Lindi Districts and at Ras Fikirini (west Mafia).

The problem of incidental capture in nets has been well documented for the Mafia Island gillnet fishery where in the 1990s annual capture rates were estimated to be approximately 200 per year (Horrill and Ngoile 1991; Darwall 1996). More recent estimates for the whole Mafia area suggest annual capture rates of between 1,000 and 2,000 turtles. In Songo Songo, 30 turtles (green, hawksbill and loggerhead) were caught on 76 fishing trips recorded during a catch monitoring survey by Frontier in 1996 (Darwall 1996b). Assuming that the capture rate remains fairly constant throughout the year, an extrapolation of catch rates for Songo Songo for all jarife fishing boats was estimated in the mid-1990s to be in excess of 810 turtles per year.

A survey of marine turtle bycatch in gillnets in Mtwara in 1996 indicated that turtles are caught in a third of all fishing trips (Darwall et al. 2000) and in 2003, fishers from Mtwara reported that the average number of turtles caught accidentally in nets ranged from 2-3 per month in Mnazi Bay to as many as 2-3 per day at Litikoto (Muir 2003). Many turtles were also said to be caught during fishing forays to northern Mozambique for sale in Mtwara town. Gillnet fishers interviewed from Pombwe (Rufiji) and Somanga Ngolwe (Kilwa) stated that they occasionally catch 10 turtles a day, notably in the seagrass beds in Mohoro Bay, but the average daily figure is 2-5. In October 2003, 5 fresh turtle carcasses were observed at Somanga Ngolwe which gillnet fishers admitted were caught in their nets. Frontier conducted a 4 days survey on incidental turtle catch around Simaya Island in 1996 during which 10 turtles were captured in gillnets. Of these, 5 were drowned, two were sold and three were released (Darwall 1996). In Mafia, a turtle catch monitoring programme was initiated in April 2004 in Mafia Island Marine Park. The information gathered indicated that turtles were caught on 45 - 60% of fishing trips by gillnet fishers in and around Chole bay on the east side of the island (Muir 2004.)

A rapid bycatch assessment was conducted in 2007 in five coastal districts. 34% of gill net fishers reported catching marine turtles in their nets. All the respondents stated that they caught on average between 1 and 10 marine turtles a year.

These results confirm that gillnets, particularly bottom set nets, pose a significant threat to marine turtles.

Marine turtle carcasses washed up on Tanzania's beaches are recorded by community Conservation Officers with an average of 200 turtles being stranded annually. However, in some years numbers can be significantly higher. For example, between July and November 2004, 105 turtle carcasses were recorded washed up on Buyuni (Temeke) alone. Local fishers report that mortalities are caused by incidental capture in gillnets. The relative threat of gillnets is unknown, but these studies suggest that gillnetting poses a significant threat.

c) Anchored Fish Aggregating Devices (FADs)

Fishing effort:

☐ RELATIVELY HIGH ☐ MODERATE ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Perceived Impact:

☐ RELATIVELY HIGH ☐ MODERATE ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Source:

d) Purse seine (with or without FADs)

Fishing effort:

☐ RELATIVELY HIGH ■ **MODERATE** ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Perceived Impact:

☐ RELATIVELY HIGH ☐ MODERATE ☐ RELATIVELY LOW ☐ NONE ■ **UNKNOWN**

Source:

e) Longline (shallow or deepset)

Fishing effort:

☐ RELATIVELY HIGH ■ **MODERATE** ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Perceived Impact:

☐ RELATIVELY HIGH ☐ MODERATE ☐ RELATIVELY LOW ☐ NONE ■ **UNKNOWN**

Source:

f) Driftnet

Fishing effort:

☐ RELATIVELY HIGH ☐ MODERATE ☐ RELATIVELY LOW ■ **NONE** ☐ UNKNOWN

Perceived Impact:

☐ RELATIVELY HIGH ☐ MODERATE ☐ RELATIVELY LOW ■ **NONE** ☐ UNKNOWN

Source:

g) Other1 (from 1.4.1): **Artisanal gears**

Fishing effort:

■ **RELATIVELY HIGH** ☐ MODERATE ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Perceived Impact:

☐ RELATIVELY HIGH ■ **MODERATE** ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Source:

h) Other2 (from 1.4.1): **Spears and spearguns**

Fishing effort:

☐ RELATIVELY HIGH ☐ MODERATE ■ **RELATIVELY LOW** ☐ NONE ☐ UNKNOWN

Perceived Impact:

☐ RELATIVELY HIGH ☐ MODERATE ■ **RELATIVELY LOW** ☐ NONE ☐ UNKNOWN

Source:

1.4.3 Describe any illegal fishing that is known to occur in or around the waters of your country that may impact marine turtles. Describe the measures being taken to deal with this problem and any difficulties encountered in this regard. [TSH]

Dynamite fishing persists along much of the Tanzanian coast. Dynamite fishing was curbed in the 1990s through the efforts of the Tanzanian Navy, but has re-emerged in recent years (Muir 2005b; Muir 2007b).

Dynamite fishing is the practice of using dynamite, homemade bombs or other explosives to stun or kill schools of fish for easy collection. Each blast instantly kills all fish and most other living organisms within a 15-20m radius of the blast. It can be extremely destructive to the surrounding ecosystem, particularly coral reefs. Dynamite fishing is indiscriminate and is having a major impact on fish stocks in Tanzania. Furthermore, the frequently improvised nature of the explosives used means dynamite fishing is high risk for the fishermen and frequently results in loss of limbs or death.

The problem of dynamite fishing is being tackled by the Ministry of Livestock and Fisheries Development, the EU, World Wide Fund for Nature, IUCN - the World Conservation Union and Sea Sense through patrols /enforcement, sensitisation of the judiciary and a community education campaign. Attempts to eradicate dynamite fishing have so far failed due to weak governance and corruption.

There is widespread use of beach seines in Tanzania, despite being an illegal gear. Beach seines degrade important inshore marine turtle habitats.

The use of poisons for fishing is becoming increasingly common although the relative threat to marine turtles is unknown.

1.4.4 Which of the following methods are used by your country to minimise incidental capture/mortality of marine turtles in fishing activities? [IND]

a) **Appropriate handling** of incidentally caught turtles (e.g. resuscitation or release by fishers using equipment such as de-hooking, line cutting tools and scoop nets)

■ **YES** ☐ NO ☐ NOT APPLICABLE

Observers on the prawn trawl by-catch survey were trained in how to handle and resuscitate marine turtles caught in nets.

In 2012 and 2013, Sea Sense NGO conducted a marine turtle bycatch awareness campaign in three coastal districts which included a component on the safe handling and release of captured turtles.

b) **Devices that allow the escape of marine turtles** (e.g. turtle excluder devices (TEDs) or other measures that are comparable in effectiveness)

☐ YES ☐ NO ■ **NOT APPLICABLE**

Turtle Excluder Devices (TEDs) are not mandatory under Tanzanian Fisheries Law. However there has been a number of meetings and workshops with a range of stakeholders to discuss issues surrounding the used of TEDS when the commercial prawn trawling industry reopens. TED trials have been undertaken by the Tanzania Fisheries Research Institute.

c) **Measures to avoid encirclement** of marine turtles in purse seine fisheries

☐ YES ■ **NO** ☐ NOT APPLICABLE

d) **Appropriate combinations** of hook design, type of bait, depth, gear specifications and fishing practices

☐ YES ■ **NO** ☐ NOT APPLICABLE

e) **Monitoring and recovery of fish aggregating devices** (FADs)

☐ YES ■ **NO** ☐ NOT APPLICABLE

f) **Net retention and recycling schemes**

☐ YES ■ **NO** ☐ NOT APPLICABLE

g) **Spatial and temporal control of fishing** (e.g. seasonal closures of fishing activities)

■ **YES** ☐ NO ☐ NOT APPLICABLE

A spatial and temporal closure of four reefs in Rufiji District was implemented by a community fisher association in 2010. However, there has not been any monitoring of the impact of this closure on marine turtles.

h) **Effort management control**

☐ YES ■ **NO** ☐ NOT APPLICABLE

☐ Other (list and explain):

☐ None of the above

1.4.5 Which of the following programmes has your country developed - in consultation with the fishing industry and fisheries management organisations - to promote implementation of measures to minimise incidental capture and mortality of turtles in national waters and in the high seas? [IND]

Onboard observer programmes

■ **YES** ☐ NO ☐ NOT APPLICABLE

On the industrial prawn trawl fishery in 2007. However the industry has been closed for the past eight years. Confirmation is needed of whether this programme will continue when the industry reopens.

Vessel monitoring systems

☐ YES ☐ NO ☐ NOT APPLICABLE

Inspections (i.e. at sea, in port, at landing sites)

☐ YES ☐ NO ☐ NOT APPLICABLE

Training programmes / workshops to educate fishers

■ **YES** ☐ NO ☐ NOT APPLICABLE

Regular workshops and meetings are held in coastal villages to educate local fishers on issues related to marine turtle conservation and protection including sea turtle biology and behaviour, habitat use, bycatch reduction and Tanzania fisheries legislation that applies to marine turtles and their habitats.

Informative videos, brochures, printed guidelines etc.

■ **YES** ☐ NO ☐ NOT APPLICABLE

Film and debate evenings are held in coastal communities and marine turtle awareness materials are distributed regularly.

Other (list and explain):

☐ YES ☐ NO ☐ NOT APPLICABLE

☐ **None of the above**

1.4.6 Are the mitigation measures described in 1.4.4 and 1.4.5, periodically reviewed and evaluated for their efficacy? [SAP]

■ **YES** ☐ NO ☐ UNSURE

Regular visits are undertaken to coastal communities to evaluate the effectiveness of training workshops. Reviews have shown that fishers who participate in training workshops and meetings rarely share information with their peers so there is a need to sensitise participants on the importance of sharing the content of workshops and meetings to encourage information dissemination and peer to peer learning.

1.4.7 In your country, what types of data collection, research and development have been undertaken to support the reduction of marine turtle incidental catch (while taking into consideration the impact of various mitigation measures on other species)? [SAP]

In Mafia, a marine turtle catch monitoring programme was initiated in April 2004 in Mafia Island Marine Park. The information gathered indicated that marine turtles were caught on 45-60% of fishing trips by gillnet fishers in and around Chole bay on the east side of the island (Muir 2004). The results were used to target bycatch awareness programmes more effectively.

In 2007, Sea Sense NGO, in collaboration with the Tanzania Fisheries Research Institute and Duke University (USA), conducted a rapid gillnet by-catch study. The results suggested that over 600 marine turtles are caught in this fishery annually (Muir et al. 2007).

From June to August 2007 a survey of by-catch in the commercial prawn trawl fishery was conducted by Sea Sense and TAFIRI. 16 marine turtles were caught in five vessels (Muir and Ngatunga, 20009).

Mortalities:

Recording of sea turtle strandings commenced in 2004 and a stranding monitoring network now operates in six coastal districts. On average, 200 mortalities are recorded each year. Many dead turtles are washed up on beaches and show

evidence of net entanglement. There is also a high incidence of marine turtle slaughter in Tanzania and discarded carapaces are often found close to villages or migrant fisher camps. Based on carapace determination, most recorded mortalities (79%) between 2004 and 2013 were attributed to green turtles. Hawksbill turtles represented 12% of all recorded mortalities, olive ridley, 4%, loggerhead, 2% and the remaining 3% were unidentified. Analysis of stranding data has facilitated the identification of bycatch hotspots and the communities which need to be targeted for marine turtle awareness campaigns.

Funding has been secured to undertake an observer programme in the artisanal gillnet fishery. The work is planned for the second half of 2014.

1.4.8 Has your country exchanged information and provided technical assistance (formally or informally) to other Signatory States to promote the activities described in 1.4.4, 1.4.5 and 1.4.7 above? [SAP]

☐ YES ☐ NO ☐ UNSURE

1.4.9 What legislative and practical measures has your country taken in support of UN General Assembly Resolution 46/215 concerning the moratorium on the use of large-scale driftnets? [SAP]

1.5.1 Does your country have legislation to prohibit direct harvest and domestic trade in marine turtles, their eggs, parts and products; and to protect important turtle habitats? [IND]

■ **YES** ☐ NO ☐ UNSURE

In Tanzania, all species listed on Appendix I of CITES are officially protected. On the mainland, marine turtles fall under the responsibility of the Fisheries Division (Ministry of Livestock and Fisheries Development).

The Tanzania Fisheries Regulations 2009, section 67 (2 - 3) state that a person shall not fish, possess, process, offer for sale or market marine turtles and a person shall not purposely disturb or destroy the feeding, breeding or nesting ground of marine turtles. In the case of a first offence, the fine is TSh 200,000 or imprisonment for not less than two years or both, and in the case of a second and subsequent offence, the offender is fined TSh 300,000 or imprisonment for not less than three years or both.

Additional regulations relating directly or indirectly to marine turtles include: section 67 (4) which states that any person who accidentally captures live marine turtles shall immediately return the animal to the sea; section 133 (13) members shall form Beach Management Units for the purpose of fisheries planning and development; and section 66 (1) b in which a person shall not use monofilament net in all fresh and marine water fisheries.

On Zanzibar, where marine turtles are classified as "fish" and under the Fisheries Act of 1988, the Director has powers to make regulations on how, when and where and what species may be caught. Marine turtles are protected by the 1993 Fisheries Regulation which prohibits fishing of marine turtles as well as possession of hawksbill or any other species of "fish" that are considered endangered or threatened under international conventions or agreements.

In addition to Fisheries legislation, the Marine Parks and Reserves Act No. 29 of 1994 provides for the establishment of marine protected areas and the protection and conservation of coastal and marine life including marine turtles. Tanzania mainland and Zanzibar have 11 marine protected areas (MPAs). These are: Mafia Island Marine Park (MIMP), Mnazi Bay-Ruvuma Estuary Marine Park (MBREMP), Tanga Coelacanth Marine Park (TACMP), Maziwe Island Marine Reserve, Dar es Salaam Marine Reserves, Menai Bay Conservation Area, Chumbe Reef Sanctuary, Misali Island Conservation Area, Mnemba Island Conservation Area, Kiwengwa Controlled Area and Jozani -Chwaka Bay National Park.

Part VI 10 (a) of the MPRU Act no. 29 states that the purposes of designation of a marine park or reserve shall be to protect, conserve, and restore the species and genetic diversity of living and non-living marine resources and the ecosystem processes of marine and coastal areas. Part X 22 (1) states that no person within a marine park or reserve shall

fish, hunt, kill or capture any fish or animal or disturb any egg, nest, roe, or spawn within the marine park or reserve.

1.5.2 Which, among the following list, are economic uses and cultural values of marine turtles in your country? Please rate the relative prevalence / importance of each consumptive or non-consumptive use. [INF]

USES / VALUES	RELATIVE PREVALENCE / IMPORTANCE
Meat consumption	
■ **YES** ☐ NO	■ **HIGH** ☐ MODERATE ☐ LOW ☐ UNKNOWN

Slaughter of nesting females occurs frequently in many coastal districts (Sea Sense, *unpublished data*) but is likely to be opportunistic rather than direct hunting (Muir, 2005). However, staff at MBREMP report that fishers set nets in areas where they are sure of catching turtles using a net known locally as "likembe" which is specifically designed to capture marine turtles.

Many Tanzanians enjoy eating turtle meat although most are aware that killing marine turtles is illegal. Marine turtles are typically sold whole for between TSh 10,000 - 40,000 (US$ 6-30) depending on size, or between TSh 2,000 - 5,000 per kilogram of meat. The sale of turtle meat has traditionally provided a valuable source of local income although some claim that they do not eat turtle meat because it is prohibited in the *Koran*. However, the status of turtles in Islamic religion appears to be a matter of personal interpretation as the meat and eggs are eaten by many Muslims, not only in Zanzibar, where Muslims comprise 95% of the population, but also in other predominately Islamic locations (eg Mafia) (Khatib et al., 1996).

Meat of the green turtle is most favoured, while that of hawksbill and loggerhead is often avoided as it is believed to be poisonous. During a survey in 2003, 60% of respondents from Pemba Island reported that turtle meat was no longer consumed. This was attributed mainly to an incident in March 1996 when two cases of poisoning through consumption of hawksbill turtle meat occurred, resulting in the death of 37 people (Slade et al., 1997). Deaths from turtle meat poisoning have also been reported from Kwale Island, Songo Songo Island, Temeke and Kilwa, but the number of deaths has not been confirmed.

Marine turtles are reported to be caught daily in fishing nets and with hand lines. The turtles are brought in to the landing sites live for sale or slaughtered at sea to reduce the chances of detection by Fisheries Officers. Turtle meat is sold regularly at the markets, particularly to Chinese buyers and turtle soup is frequently sold in local bars. The meat is believed to improve the immune system. Turtle scutes and oil are also sold for medicinal purposes.

During a survey of Dar es Salaam fish market in 2009, 39 interviews were held with traders who all admitted to knowing that marine turtles are protected. Trade is done in secret and is thought to be the result of the high level of marine turtle bycatch in fishing nets. Traders reported that fishers never release captured turtles but bring them to the market for slaughter and subsequent sale.

Egg consumption	
■ **YES** ☐ NO	☐ HIGH ■ **MODERATE** ☐ LOW ☐ UNKNOWN

Nest poaching has occurred in Tanzania for generations. Turtle tracks left in the sand during nesting show clearly the location of the nest and the eggs are normally found using a sharpened stick. Evidence of egg collection has been observed along most of the Tanzanian coast (Sea Sense, *unpublished data*). During an interview survey with local communities in 2003, 84% (378) of respondents reported that turtle eggs are collected for domestic consumption and are only occasionally sold, either per egg (TSh 20 – 100) or per slice of omelette (TSh 50 – 100) (Muir, *unpublished data*). However, surveys at several fish markets in the Dar es Salaam area in 2008 and 2009 confirmed that trade in marine turtle eggs does exist (West et al, 2009).

Shell products

■ **YES** ☐ NO ☐ HIGH ☐ MODERATE ■ **LOW** ☐ UNKNOWN

The rapid growth of tourism in Zanzibar in the early 1990's created a new souvenir market for marine turtle shells and turtle products such as jewellery, and may have encouraged hunting of them. Such souvenirs were sold in Zanzibar Stone Town and on the east coast of the island. The trade ceased following the collection and burning of 657 turtle products from curio shops in 1995 (Khatib et al., 1996). However, the curio trade in hawksbill products in Zanzibar has recently re-emerged (*pers. comms.*)

During a survey at Dar es Salaam fish markets in 2008, 48 people were informally interviewed over a period of seven weeks. Marine turtle carapaces were found to be on sale at several markets in the Dar es Salaam area fetching between US$3 – 12 depending on size. The shells are usually varnished and then sold for decoration to Tanzanians. Occasionally they are used as water containers for livestock. It is believed that livestock production will increase if animals drink water from a turtle carapace.

A survey of the marine curio trade in Dar es Salaam in 2011 confirmed that trade in marine turtle shells still exists. Undercover investigators inquired about the availability of turtle shells and traders responded that they could have a shell available by the following day.

Fat consumption

■ **YES** ☐ NO ☐ HIGH ■ **MODERATE** ☐ LOW ☐ UNKNOWN

During a survey in 2003 in Zanzibar, 14% (63) of respondents mentioned uses for turtle oil, most commonly as a cooking fat (33%). It is occasionally used to waterproof traditional wooden dhows (Muir, *unpublished data*).

Traditional medicine

■ **YES** ☐ NO ☐ HIGH ■ **MODERATE** ☐ LOW ☐ UNKNOWN

In Zanzibar, Clark & Khatib (1993) reported that many residents believe marine turtle products (meat, oil, eggs, shell, skin and internal organs) have medicinal properties and use them to treat a wide range of diseases. In Tanga, oil is used mainly as a cure for earache and in Mtwara turtle oil is applied to the skin to heal burns and rashes. In other parts of Tanzania, oil is used to treat asthma, hernias and muscle ache (Muir, *unpublished data*).

Eco-tourism programmes

■ **YES** ☐ NO ■ **HIGH** ☐ MODERATE ☐ LOW ☐ UNKNOWN

Marine turtle ecotourism programmes have been established in Temeke, Mafia and Pangani Districts. Tourists are guided to nesting beaches by community tour guides and are able to watch turtle hatchlings emerging from their nest. Visitors pay a small fee to participate in marine turtle ecotourism and the revenue is used to support marine turtle conservation efforts and community development projects.

Cultural / traditional significance

■ **YES** ☐ NO ☐ HIGH ☐ MODERATE ■ **LOW** ☐ UNKNOWN

Current information on turtle uses and myths in Tanzania is based on questionnaire surveys conducted in Pemba and Unguja between 1995 and 1998 (Clark and Khatib, 1993; Slade et al. 1997; Khatib 1998), a national questionnaire survey (450 respondents) conducted between April and June 2003 by the TTDCP (Muir unpublished data) and a survey conducted in 2011 in Mkinga and Mtwara Districts. Cultural significance is mostly based around the perceived medicinal benefits associated with the consumption of turtle meat and oil.

Other

1.5.3 Please indicate the relative level and impact of traditional harvest on marine turtles and their eggs. [IND, TSH]

Level of harvest:

☐ RELATIVELY HIGH ■ **MODERATE** ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Impact of harvest:

☐ RELATIVELY HIGH ■ **MODERATE** ☐ RELATIVELY LOW ☐ NONE ☐ UNKNOWN

Source of information:

Egg collection and hunting of nesting females for meat have been considered by some as two of the main threats to marine turtles (Clark and Khatib 1993; Slade 2000).

1.5.4 Have any domestic management programmes been established to limit the levels of intentional harvest? [SAP]

■ **YES** ☐ NO ☐ UNKNOWN

In mainland Tanzania, involvement of local communities in nest protection, monitoring, data collection and awareness raising has played a key role in reducing intentional harvest of marine turtles. Marine turtle ecotourism has also played a major role in the reduction of slaughter of nesting females.

1.5.5 Describe any management agreements negotiated between your country and other States in relation to sustainable levels of traditional harvest, to ensure that such harvest does not undermine conservation efforts. [BPR]

1.6.1 First, select one of the options at left to indicate whether or not your country has any of the following measures in place to minimise the mortality of eggs, hatchlings and nesting females. If yes, then estimate the relative effectiveness of these measures. [IND, SAP]

MEASURES	RELATIVE EFFECTIVENESS
Monitoring/protection programmes	
■ **YES** ☐ NO ☐ N/A	■ **EXCELLENT** ☐ GOOD ☐ LOW ☐ UNKNOWN

In January 2001, a community-based marine turtle conservation initiative was established in Mafia district (Mafia Island) by Sea Sense NGO. The initiative focused on promoting the long-term survival of marine turtles and their habitats, in collaboration with Mafia District Council, Mafia Island Marine Park and local communities. This featured a long term marine turtle nest monitoring programme led by a network of community Conservation Officers who received training from Sea Sense in practical marine turtle conservation techniques including nest relocations and post hatching excavations. Each Conservation Officer conducts early morning foot patrols throughout the year at five key nesting sites. Data is collected on nesting species, nest location and frequency of nesting activity. Nests are located and identified by day track counts. Threats to nesting females and incubating eggs are also recorded and any nest under threat from poaching, predation or tidal inundation is relocated to a safer area. All nests are monitored until hatching and then excavated to assess hatching success. Standard protocols are used for all monitoring and protection techniques as described in Eckert et al., 1999.

A nest protection incentive scheme was initiated in 2002. Under this scheme, individuals who report a nest to a Conservation Officer receive an initial reward of USD$3 once the nest is verified. They assist the turtle monitor in protecting the nest from human and non-human predators during the incubation period and are rewarded with a second payment of USD 0.40 for every successful hatchling and USD 0.20 for every rotten egg.

In May 2004, the scope of the nest monitoring programme was scaled up to include the entire mainland coast of Tanzania, using Mafia as a successful working model. Community-based nest monitoring and protection programmes are now established in six coastal districts - Pangani, Temeke, Mkuranga, Rufiji, Kilwa and Mafia and the network now consists of 33 Conservation Officers. More than 6,000 marine turtle nests have been identified and monitored since the implementation of the Sea Sense nest monitoring programme in 2001 and over 290,000 hatchlings have reached the sea. Mean hatching success rates are 74% for green turtles and 73% for hawksbill turtles (for the period 2001 - 2013).

In addition, opportunistic day and night patrols have been undertaken to nearby islands in the Mafia archipelago where marine turtle nesting has been reported by local fishers. Results indicate that Shungi-mbili is an important nesting site, particularly for critically endangered hawksbill turtles (Muir & Abdallah, 2002). However, seasonal fisher camps on the island have disturbed nesting females and those that do come ashore to nest are either slaughtered, or their eggs are poached (Muir & Abdallah, 2002).

Since 2002, the Marine Parks and Reserves Unit (Ministry of Livestock and Fisheries Development) has been monitoring marine turtle nesting activity in the Dar es Salaam Marine Reserves of Bongoyo, Mbudya and Pangavini islands with the help of Honorary Wardens who received training from Sea Sense.

In April 2004, a marine turtle monitoring and conservation programme was established by the Mnazi Bay - Ruvuma Estuary Marine Park (MBREMP) in Mtwara District using experiences from Mafia. Four locally elected villagers assist with patrols, data collection and awareness raising. A single incentive of US$3 is given to individuals who report a nest. Beach patrols have contributed greatly to the reduction in nest poaching (Muir 2005b). Under this programme, marine turtle nesting sites are managed in collaboration with local communities. Data is collected on nesting activity and incidences of turtle slaughter and mortality.

A green turtle nest monitoring programme was established in Mnemba Island on the north east coast of Zanzibar in 2001. The programme is run by hotel staff who manage a luxury lodge on the island. Security staff patrol the beaches each night and monitor turtle nesting activity. Morphometric data is collected from nesting females together with data on incubation periods and hatching success rates. Any nesting female encountered during night patrols is tagged with a titanium flipper tag.

Education/awareness programmes

■ **YES** ☐ NO ☐ N/A ■ **EXCELLENT** ☐ GOOD ☐ LOW ☐ UNKNOWN

A diverse range of education / awareness programmes are implemented in coastal communities along the length of the Tanzania coast. Education / awareness activities include primary and secondary school competitions (trash art, painting, poetry, theatre, song), community events on World Environment Day and World Sea Turtle Day, film and debate evenings, community theatre projects, village meetings, focus group discussions and distribution of awareness materials (brochures, posters, t-shirts etc).

Egg relocation/hatcheries

■ **YES** ☐ NO ☐ N/A ■ **EXCELLENT** ☐ GOOD ☐ LOW ☐ UNKNOWN

Conservation Officers and Marine Park wardens have been trained in nest relocation protocols. Nests are relocated to safer areas when they are at risk of predation, poaching or inundation by the high tide (St John and Muir 2006; Muir 2007a; Muir 2007b).

Predator control

■ **YES** ☐ NO ☐ N/A ☐ EXCELLENT ■ **GOOD** ☐ LOW ☐ UNKNOWN

Natural predators such as monitor lizards (*Varanus spp*), mongoose (*Herpestes javanicus*), termites (*Isoptera*) and feral dogs (*Canis spp) pose a significant threat to incubating turtle eggs. Ghost crabs (Ocypode spp), Indian house crows (Corvus splendens) and other birds prey on hatchlings as they emerge from the nest.*

Measures to control predation include placing heavy duty trawler net over the nests and placing cold ash at the bottom and top of the nest. Many nests, particularly in Temeke District, have been fully or partly predated by fire ants. Ash does not seem to have been effective (Muir 2007a; Muir 2007b).

Vehicle / access restrictions

■ **YES** ☐ NO ☐ N/A ☐ EXCELLENT ☐ GOOD ☐ LOW ■ **UNKNOWN**

Vehicles have been banned from Msimbati beach in Mtwara which is a known turtle nesting site.

Removal of debris / clean-up

■ **YES** ☐ NO ☐ N/A ☐ EXCELLENT ☐ GOOD ■ **LOW** ☐ UNKNOWN

Frequent beach clean up activities are carried out in Juani Island, Mafia District, where large amounts of marine debris are deposited on nesting beaches each day by the incoming tide.

In 2013, a flip flop recycling initiative was established in Juani Island whereby members of the local community collect discarded flip flops and recycle them into handicrafts for sale to visitors.

Re-vegetation of frontal dunes

☐ YES ■ **NO** ☐ N/A ☐ EXCELLENT ☐ GOOD ■ **LOW** ☐ UNKNOWN

The threat of erosion is illustrated by the case of Maziwe Island which submerged in the 1980s, and in Zanzibar, a study commissioned by the Department of Environment, indicates that the coastline is being eroded at a rate of 1-3 meters a year. The areas most threatened in Unguja include Nungwi, Bwejuu, Jambiani and Mnemba Island (Khatib 1998). Since 2001, the islands of Shungi-mbili and Nyroro have been severely eroded, partly from natural causes and partly due to felling of vegetation by fishermen to supply firewood and to cure sea cucumbers. This has led to the creation of very steep beach walls which turtles have difficulty climbing to nest, and an increase in the general level of activity on the island with reduced space available for fishers to camp. This has resulted in a reduction in the number of turtles that nest and those that do, typically lay their eggs below the sand wall where the eggs are inundated (Muir 2005b). A tree replanting initiative has been implemented as part of a migrant fisher awareness campaign.

Building location/design regulations

■ **YES** ☐ NO ☐ N/A ☐ EXCELLENT ☐ GOOD ■ **LOW** ☐ UNKNOWN

Disturbance of nesting beaches from tourism development is a major concern for marine turtle populations in Zanzibar (Bourjea et al., 2008). There has been a massive increase in tourism in Zanzibar since the early 1990's (Slade, 2000). The Zanzibar Tourism Development Plan (UNDP 1983) reported only 10 unclassified accommodation units with 215 rooms and 467 beds. By 1990 there were 45 hotels providing a total of 548 rooms and 1063 beds. By the year 2000 there were 157 accommodation units with 5224 beds. This represents a 1,120% increase in number of beds since 1983 and the number is still increasing. Many hotels have been built on former nesting beaches and as a result there has been a marked decline in turtle nesting in those areas (Whitney et al, 2003). Kiwengwa beach on the northeast coast of Unguja, an important turtle nesting beach, has been rendered totally unsuitable for nesting turtles as a direct result of hotel development. Natural beach vegetation has been cleared in many areas and beachfront shops and restaurants have been built. Tanzanian law requiring a 60m set back limit from the high spring tide mark is seldom enforced and plans for sensitive beach lighting are rarely incorporated into mitigation measures. Disturbance from tourism is less of an issue along the mainland coast where the industry is less developed.

Light pollution reduction

☐ YES ■ **NO** ☐ N/A ☐ EXCELLENT ☐ GOOD ☐ LOW ☐ UNKNOWN

Other (list and rate them)

☐ YES ☐ NO ☐ N/A

1.6.2 Has your country undertaken any evaluation of its nest and beach management programmes? [SAP]

■ **YES** ☐ NO ☐ NOT APPLICABLE

Nesting data from Mafia Island were analysed in 2011. There was a significant increase (ANOVA test, $p<0.001$) in the annual number of nests recorded in Mafia Island between 2002 and 2010 (Sea Sense, unpublished data).

OBJECTIVE II. PROTECT, CONSERVE AND REHABILITATE MARINE TURTLE HABITATS

2.1.1 What is being done to protect critical habitats *outside* of established protected areas? (NB: It is assumed that legislation relating to established protected areas will have been described in Section 1.5.1) [BPR, SAP]

Nesting habitats along the Tanzania mainland are protected by a network of community Conservation Officers who patrol the beaches every day, all year round. The Conservation Officers also play a vital awareness raising role in their communities, sensitising local fishers who use gears that degrade foraging and developmental habitats e.g. beach seines or participate in destructive activities such as dynamite fishing.

A marine turtle ecotourism initiative has been established at the three largest green turtle rookeries in Tanzania, two of which are outside of marine protected areas. The initiative has ensured a more permanent presence on nesting beaches.

A marine conservation education and awareness programme is implemented in coastal communities. The programme includes awareness activities that focus on conservation of critical marine habitats including coral reefs, seagrasses and mangroves. Mangrove replanting projects have been implemented in places suffering from intensive mangrove cutting.

The Tanzania Fisheries Regulations 2009 also provide protection for critical habitats and specify where and when certain gears can be used e.g. trawl nets.

2.1.2 Are assessments routinely made of the environmental impact of marine and coastal development on marine turtles and their habitats? [IND, SAP]

■ **YES** ☐ NO ☐ NOT APPLICABLE

EIAs are the responsibility of the National Environmental management Council (NEMC). The Environmental Management Act No. 20 of 2004 gives NEMC mandates to undertake enforcement, compliance, review and monitoring of EIAs. NEMC is also charged to recommend and prepare terms and conditions for issuance of the EIA Certificate by the Minister.

Surveys of marine turtle habitats were conducted in 2013 as part of a Scoping Assessment for the construction of an LNG plant in Lindi Region.

2.1.3 Is marine water quality (including marine debris) monitored near turtle habitats? If yes, describe the nature of this monitoring and any remedial measures that may have been taken. [SAP]

☐ YES ■ **NO** ☐ NOT APPLICABLE

Water quality assessments are not conducted routinely near turtle habitats. However, there has been some research on the issue. Mmochi and Mberek (1998) specifically investigated trends in agricultural pesticide use in Zanzibar, for the period 1977 to 1988. Zanzibar is set on reducing the use of pesticides in agriculture, and this study demonstrated a decrease in toxicity of chemicals being used. Mohammed (2002) reviewed previous water quality studies conducted in Tanzania; it was concluded that water pollution in Tanzania had not yet reached critical levels at that time.

However, the accumulation of toxic metals in marine environments has become a problem of increasing concern. In Tanzania, large amounts of industrial and domestic waste from major coastal cities such as Dar es Salaam, Tanga and Zanzibar are released into the marine environment without undergoing treatment. The wastes are sometimes contaminated with hazardous heavy metals such as lead, zinc and cadmium, among others. Elevated concentrations of these metals have been measured in sediment along the coastal waters of Tanzania. A study published in March 2014 (Johnson & Sekadende, 2014) showed the presence of lead in the muscles of Octopus cyanea indicating a contaminated environment in Tanzania coastal waters.

In addition, sewage from the central sewerage system in Dar es Salaam is discharged untreated into the Indian Ocean. Pollution from sewage discharge, development and industry, and macrodebris (such as plastics) in the water and on nesting beaches have been identified as potentially important threats to marine turtles in Tanzania (Slade 2000; Muir 2005b).

Johnson Grayson Mshana and Baraka Sekadende (2014) Assessment of Heavy Metal Pollution in Octopus cyanea in the Coastal Waters of Tanzania. Journal of Health and Pollution: March 2014, Vol. 4, No. 6, pp. 10-17.

Mmochi, J., Mberek, R.S. 1998. Trends in the types, amounts and toxicity of pesticide use in Tanzania: Efforts to control pesticide pollution in Zanzibar, Tanzania. Ambio 27(8): 669 - 676.

Mohammed, S.M. 2002. A review of water quality and pollution studies in Tanzania. Ambio 31(7/8): 617 - 620.

2.1.4 Are measures in place to prohibit the use of poisonous chemicals and explosives? [SAP]

■ YES ☐ NO ☐ NOT APPLICABLE

Legislation is in place prohibiting the use of chemicals and explosives for fishing. The Tanzania Fisheries Regulations 2009 Part V 47 (1) state that a person shall not use poison to kill or catch fish. Part V 48 (1) state that a person shall not possess or use with intent of killing fish, fishing or destroy fishery habitats, explosives or explosive material; dynamite; pyrotechnic substance; detonators to initiate explosion; plastic explosive.

However, dynamite and poison fishing are practiced daily along the length of the Tanzania coast. The practice of dynamite fishing is being tackled by the Tanzania Ministry of Livestock and Fisheries Development, World Wide Fund for Nature, the EU and Sea Sense NGO through patrols / enforcement, sensitisation of the judiciary and a community education campaign.

2.2.1 Are efforts being made to recover degraded coral reefs? If yes, give details (location, duration, effectiveness, lessons learned, future plans etc). [IND, SAP]

☐ YES ☐ NO ☐ NOT APPLICABLE (no degraded coral reefs)

Research studies are being conducted at University of Dar es Salaam and the Institute of Marine Science in Zanzibar.

Suleiman, M., C. Muhando, H. Machano, S. Daniels, E. Tyler, N. Jiddawi and S. Yahya, 2005. Status of Coral Reefs in Tanzania. In Souter, D and O. Linden (eds). 2005. Coral reef degradation in the Indian Ocean. Status Report 2005. CORDIO (Coastal Oceans Research and Development in the Indian Ocean). Mombasa.

Coral reef monitoring is conducted by Frontier NGO in Mafia Island Marine Park.

2.2.2 Are efforts being made to recover degraded mangrove habitats that are important for turtles? If yes, give details (location, duration, effectiveness, lessons learned, future plans etc.) [IND, SAP]

■ **YES** ☐ NO ☐ NOT APPLICABLE (no mangrove habitats important for turtles)

Tanzania has prepared a National Mangrove Management Plan (1991), which allows for degraded mangrove forests to be closed to facilitate recovery (Semesi 1992). However, this management plan is still not followed closely (Semesi 1998). One of the constraints in implementing the management plan is a lack of trained personnel.

Semesi, A.K. 1992. Developing management plans for the mangrove forest reserves of mainland Tanzania. Hydrobiologia 247, 1-10.
Semesi, A.K. 1998. Mangrove Management and Utilization in Eastern Africa. Ambio 27(8):620-626.

Sea Sense NGO has conducted mangrove replanting initiatives in Temeke District and Pangani District where extensive cutting had taken place.

A remote-sensing study conducted in association with Sokoine University has shown that over 5,000 hectares of Rufiji mangrove forest have been lost to rice cultivation over the past 20-30 years. WWF is working with the Forestry Division to replant and restore mangrove habitats degraded by illegal rice farming in the Rufiji Delta.

2.2.3 Are efforts being made to recover degraded sea grass habitats? If yes, give details (location, duration, effectiveness, lessons learned, future plans etc.). [IND, SAP]

■ **YES** ☐ NO ☐ NOT APPLICABLE (no degraded sea grass habitats)

The commercial prawn trawling industry was closed in 2008 in Tanzania to allow stocks to recover and to facilitate the recovery of degraded seagrass habitat. The initial closure was for two years although it remains closed six years later.

OBJECTIVE III. IMPROVE UNDERSTANDING OF MARINE TURTLE ECOLOGY AND POPULATIONS THROUGH RESEARCH, MONITORING AND INFORMATION EXCHANGE

3.1.1 Give a list of available literature that includes baseline information from studies carried out in your country on marine turtle populations and their habitats. [INF]

Adams, M.A., Khatib, A.A. 1996. Sea turtle conservation on Zanzibar: A comparative survey of - community perspectives. 1-41 p.

Clark, F. 1992. Pemba sea turtle survey: Report on pre-survey training workshop for village contacts.

Clark, F., Khatib, A.A. 1993. Sea turtles in Zanzibar: Status, distribution, management options and local perspectives. Zanzibar Environmental Study Series No. 15b. 1-84 p.

Clark, F., Khatib, A.A. 1993. Sea turtles in Zanzibar - a preliminary study. 1-35 p.

Cowper, D., Darwall, W.R. 1996. Sea turtles of the Songo Songo Islands. *Miombo* 15: 14-15.

Darwall, W.R.T., Choiseul, V.M. 1996. Marine biological and marine resource use surveys in the Songo Songo Archipelago, Tanzania. No. 4: Okuza Island.

Darwall, W.R.T. 1996. Marine biological and marine resource use surveys in the Songo Songo Archipelago, Tanzania. No. 3: Simaya Island.

Eastern African Marine Ecoregion Programme 2004. The Eastern African Marine Ecoregion Conservation Plan 2005-2009. 1-62 p.

Francis, J., Bryceson, I. 2000. Tanzanian coastal and marine resources: Some examples illustrating questions of sustainable use. 76-102 p. In *Lessons learned: Case studies in sustainable use.*

Frazier J & Rodgers, WA. 1974. Marine turtles in Tanzania. Unpublished.

Frazier, J. 1975. Sea turtles. Conservation Bulletin, No. 9. Wildlife Clubs of Kenya.

Frazier, J. G. 1976. Sea turtles in Tanzania. *Tanzania Notes and Records* 77/78: 11-20.

Frazier, J. 1980. Exploitation of marine turtles in the Indian Ocean. *Human Ecology*: 8 (4) 329-369.

Frazier, J.G. 1993. Dry coastal ecosystems of Kenya and Tanzania. 129-150 p. In: Van der Maarel, E. (Ed.), *Dry Coastal Ecosystems: Africa, America, Asia and Oceania. Ecosystems of the World*. Elsevier, New York.

Gove, D, Pacule, H & Goncalves, M. 2001. The impact of Sofala Bank (Central Mozambique) shallow water shrimp fishery on marine turtles and the effects of introducing TEDs on the shrimp fishery. WWF. 23 pp

Guard, M., Muller, C., Evans, D. 1998. Marine biological and resource use surveys in Mtwara District, Tanzania. Comparative summary report of fringing and coral reefs within and adjacent to Mnazi Bay. Report No. 1. The Society for Environmental Exploration and the University of Dar es Salaam.

Hiebler, J.A., Wong, M.J., Khatib, A.A., Mohammed, S.M. 1997. Sea turtle conservation: Public awareness and captive environments. 1-33 p.

Howell, K.M. 1993. A review of the conservation status of sea turtles in Tanzania.

Howell, K.M., Mbindo, C. 1996. The status of sea turtle conservation in Tanzania. 73-80 p. In: Humphrey, S., Salm, R.V. (Eds.), *Status of sea turtle conservation in the Western Indian Ocean*. IUCN/UNEP, Nairobi, Kenya.

Hughes, GR. 1995. Conservation of sea turtles in the Southern Africa region. In: K A Bjorndal (Ed), Biology and Conservation of Sea Turtles, Revised Edition. Smithsonian Institution Press, Washington DC. 619 pp.

Khatib, AA, Khiari, SK & Mbindo, C. 1996. The status of sea turtle conservation in Zanzibar. In: IUCN/UNEP. Humphrey SL & Salm RV (eds.): Status of sea turtle conservation in the Western Indian Ocean. Regional Seas Reports and Studies.

Khatib, A.A. 1998. Sea turtles nest recording program: Unguja Island. *Ambio* 27: 763-764.

Khatib, A.A. 1998. The turtle nesting programme: Unguja Island report 1997-1998. 1-21 p.

Khatib, A.A., Nassor, M.S. 2006. Assessing the importance of sea turtle mortality due to fisheries. Lugendo, BR, Mgaya, YD & Semesi, AK. 1997. The seagrass and associated macroalgae at selected beaches along Dar es Salaam coast.

Mack, D, Duplaix, N & Wells, S. 1995. Sea turtles, animals of divisible parts: international trade in sea turtle products. In: K A Bjorndal (Ed), Biology and Conservation of Sea Turtles, Revised Edition. Smithsonian Institution Press, Washington DC. 619 pp.

Mahenge, J. 2004. Quarterly activity report: Mnazi Bay-Ruvuma Estuary Marine Park.

Muir, C.E. 2003. An Assessment of the status of turtles, dugongs and cetaceans in Mnazi Bay-Ruvuma Estuary Marine Park & recommendations for a conservation strategy. Report to IUCN / MBREMP Project.

Muir, C.E. 2004a. Community-based marine turtle conservation in Tanzania. 5-6 p.

Muir, C.E. 2004b. Mafia turtle and dugong conservation programme: Tanzania. Results FY04 (01 July 2003 - 30 June 2004). 1 pp.

Muir, C.E. 2004c. Tanzania Turtle & Dugong Conservation & Research Programme - quarterly progress report. Submitted to Commission for Science & Technology, Dar es Salaam.

Muir, C.E. 2005a. Tanzania turtle and dugong conservation programme: Progress report January - June 2005. 1 pp.

Muir, C.E. 2005b. The status of marine turtles in the United Republic of Tanzania, East Africa. Sea Sense Report (Tanzania Turtle and Dugong Conservation Programme).

Muir, C.E. 2005c. The status of marine turtles in the United Republic of Tanzania. 12-13 p. In: Humphrey, S.L., Wilson, A. (Eds.), *Marine turtle update: Recent news from the WWF Africa and Madagascar marine turtle programme*.

Muir, C.E. 2006. The relative importance of sea turtle mortality due to fisheries in Tanzania.

Muir, C.E. 2007a. Sea Sense Technical Report: June 2007. 1-9 p.

Muir, C.E. 2007b. Community-based endangered marine species conservation: Tanzania.

Muir, C.E., Abdallah, O. 2003. Tanzania Turtle and Dugong Conservation and Research Programme: Annual progress report.

Mortimer, J.A., Donnelly, M. 2007. Marine turtle specialist group 2007 red list status assessment: Hawksbill turtle (*Eretmochelys imbricata*). 1-121 p.

Muir, C.E & Ngatunga, BP. 2007. Rapid Gillnet Bycatch Survey - United Republic of Tanzania. In prep.

Ngusaru, A., Tobey, J., Luhikula, G. 2001. Tanzania state of the coast 2001: People and the environment. Ochieng, C.A. & Erftemeijer, P.L.A. 2002. The status of seagrass ecosystems in Kenya and Tanzania. University of Dar es Salaam. 39pp.

O ' Grady, G & Muhidini, M. 2003. Green turtle monitoring at Mnemba. Ecological Journal, Volume 5. Conservation Corporation Africa.

Pharaoh, A.M., Fanning, E., Said, A. 2003. Observations of sea turtles nesting on Misali Island, Pemba. *Journal of East African Natural History* 92: 127-134.

Richmond, M.D. (ed.). 1997. A guide to the Sea Shores of Eastern Africa and the Western Indian Ocean Islands. Sida

Department for Research Cooperation, SAREC, 448pp.

Richmond, M. D., Wilson, J., Mgaya, Y. & le Vay, L., 2002. An analysis of small holder opportunities in fisheries, coastal and related enterprises in the floodplain and delta areas of the Rufiji River, Tanzania. REMP Technical Report No. 25.

Semesi, A.K., Mgaya, Y., Muruke, M.H.S., Francis, J., Mtolera, M., Msumi, G. 1998. Coastal resources utilisation issues in Bagamoyo, Tanzania. Ambio 27: 635-644.

Slade, L, Khatib, AA & Yussuf MH. 1997. Sea turtles in Zanzibar: Pemba sea turtle conservation education and community nest recording programme - November 1995 - March 1997. Department of Environment, Zanzibar.

Slade, L. 2000. Sea turtle recovery action plan for Zanzibar. 1-91 p.

St John, F., Muir, C.E. 2006. Sea Sense Annual Report: July 2005 - June 2006. 1-14 p.

Tanzania Coastal Management Partnership. 2003. Tanzania: State of the coast: The national ICM strategy and prospects for poverty reduction.

Thiagarajan, T. 1991. Status of sea turtles in Zanzibar. 1-12 p.

Trindade, J & West, L. 2014. A Trans-Boundary Green Turtle (Chelonia mydas) Nesting Event in East Africa. African Sea Turtle Newsletter. Issue 1/2014. Troeng, S. & Drews, C. 2004. Money talks: economic aspects of marine turtle use and conservation. WWF-International, Gland, Switzerland UNEP, 2001. Eastern Africa Atlas of Coastal Resources: Tanzania. Nairobi, Kenya.

United Republic of Tanzania, 2003. National Integrated Environment Management Strategy. Vice President's Office, Dar es Salaam.

Wang, YQ, Ngusaru, A, Tobey, J, Makota, V, Bonynge, G, Nugranad, J, Traber, M & Bowen, R. 2003. Remote sensing of mangrove change along the Tanzania coast. Marine Geodesy, 26(1-2): 1-14.

Wamukoya, G.M. and Salm, R. V. 1998. Report of the Western Indian Ocean turtle excluder device (TED) training workshop. 1-36 p.

West, L. Sea Sense Annual Reports, 2008 - 2012 http://www.seasense.org/publications/

West, L. 2010. A multi-stakeholder approach to sea turtle conservation in the United Republic of Tanzania. 11th Indian Ocean Turtle Newsletter.

West, L; Mchomvu, B; Abdallah, O; Mapoy, S. 2013. Green turtle nesting activity at Juani Island, Tanzania, during the 2012 peak nesting season. 17th Indian Ocean Turtle Newsletter.

West, L & Hoza, R.B. 2014. Recognising the Regional Importance of the Central Tanzanian Coast to Marine Turtles. African Sea Turtle Newsletter. Issue 1/2014.

3.1.2 Have long-term monitoring programmes (i.e. of at least 10 years duration) been initiated or planned for priority marine turtle populations frequenting the territory of your country? [IND, BPR]

■ **YES** ☐ NO ☐ UNSURE

There are several long term marine turtle monitoring programmes in Tanzania. Sea Sense NGO has been monitoring marine turtle nesting activity in Mafia Island since 2001 and in Temeke District since 2004. In the Zanzibar archipelago, a long term nest monitoring programme has been in place in Mnemba Island since 2001 and since 1998 in Misali Island, Pemba although effort has varied at both sites.

Nesting populations have been monitored in Mnazi Bay Ruvuma Estuary Marine Park since 2004 although effort has varied

considerably during those ten years.

A marine turtle stranding network has been operational since 2004 in four coastal districts.

Monitoring of international flipper tag recoveries on the Tanzania mainland has occurred since 2001.

3.1.3 Has the genetic identity of marine turtle populations in your country been characterised? [INF, PRI]

■ **YES** ☐ NO ☐ UNSURE

Tanzania contributed 40 green turtles tissue samples to a study being conducted in La Reunion on the genetic diversity of green turtles in the south west Indian Ocean.

3.1.4 Which of the following methods have been or are being used to try to identify migration routes of turtles? Use the text boxes to provide additional details. [INF, PRI]

Tagging ■ **YES** ☐ NO

Evidence from international flipper tag recoveries indicates that the central Tanzania coast is an important migratory route and foraging ground for marine turtles nesting elsewhere in the region. Flipper tags have been recovered from three of the five marine turtle species present in the region. Tags originated in Kenya, Seychelles, Comoros, Mayotte, Mozambique and South Africa.

Sea Sense NGO established a database of international flipper tag recoveries in 2004. Between 2004 and 2013, 126 tags were recovered. 75% of the tags were recovered from green turtles which were tagged while nesting at regionally important nesting sites in Seychelles, Mayotte and Comoros indicating that green turtles undertake open water migrations between Indian Ocean islands and the East Africa continental shelf, a distance of up to 1,000km.

Evidence from tag returns from loggerhead turtles caught in nets off Mtwara and Mafia indicate that southern Tanzania and the Mafia area are important foraging grounds for loggerheads nesting in Tongaland and Natal, South Africa. Three tagged animals were caught in southern Tanzania in 1976. One animal swam a distance of at least 2,640km in 66 days between its release in Natal and its capture at Kilwa Masoko and a second animal accomplished a similar feat (Frazier 1976). Since 2001, tags have been recovered by Sea Sense from 5 loggerhead turtles caught in gillnets: 3 at Jibondo Island off southeast Mafia, and 2 off Songo Songo Island (Muir 2005b). All were tagged while nesting in Tongaland and Natal in South Africa (Muir 2003).

Satellite tracking ■ **YES** ☐ NO

Ten satellite tags have been deployed on adult female green turtles nesting in Tanzania between 2012 - 2014 to determine post nesting migratory routes and the location of foraging grounds. Three individuals were tracked to foraging grounds in Tanzania and three to foraging grounds elsewhere in the region (Kenya and Somalia). Three tags failed before migrations commenced.

One of the turtles satellite tagged in 2012 was encountered on a nesting beach again in May 2014 so she was tagged a second time to determine levels of fidelity to her migratory route and foraging ground (data still being collected).

■ **Other**

Five green turtles have been tagged with geolocator tags in Tanzania to investigate inter-nesting movements. One LTD 2000 series geolocation tag (LTD 2310 with stalk) was attached to the carapace of a nesting green turtle in Juani Island, Mafia District in May 2005. The tag was recovered 15 days later when the turtle returned to nest.

The tag was set to log light levels, depth and external temperature data at one minute intervals. The turtle spent a considerable proportion of the total mission time at a depth of 14m (14.73% of total mission). 11.64% of time was spent at the surface.

Dive depth reflected a relationship with daylight, with dive depth being shallower during hours of darkness (10 – 11m) and deeper during daylights hours (16 – 27m).

Analysis of dive profiles further underline the deeper daytime diving compared to night time dives. This behaviour may suggest that the turtle spent time resting on or near the bottom of her shallow coastal inter-nesting habitat at a depth close to where she may reach neutral buoyancy.

By day 11 her night time dive profile became more erratic than previous mission days. By day 13 she spent a considerable time on the surface during the night. This may represent a non-nesting emergence, although this was not confirmed by a visual sighting by the night patrol team. Her erratic night time dive profiles continue for days 14 and 15, after which she nested and the tag was removed.

Location data indicates that the turtle travelled considerable distances during her inter-nesting period although there appeared to be a significant degree of error in the data collected by the LTD tag. Therefore no meaningful conclusions were made about the degree of inter-nesting movement.

A further two nesting green turtles were tagged with LTD 2000 series geolocation tags in 2005. Tags A1909b and A0323 were deployed on green turtles nesting on the mainland coast of Tanzania in Temeke District. However, the tags were never retrieved.

In 2006 two more tags (A0324 and A0348) were deployed on nesting green turtles in Juani Island, Mafia District. The tags were retrieved after 14 days and 20 days respectively. A0348 suffered significant damage, with the antennae being completely ripped from the tag. The A0324 suffered no external damage but it was not possible to retrieve data from either tag. Both tags were returned to Lotek for inspection but all data was lost.

☐ **None of the above**

3.1.5 Have studies been carried out on marine turtle population dynamics and survival rates (e.g. including studies into the survival rates of incidentally caught and released turtles)? [INF, PRI]

■ **YES** ☐ NO ☐ UNSURE

Between 2001 and 2010, 55 green turtles were tagged on an opportunistic basis in Mafia Island, either as a result of bycatch or nesting encounters. Two of the nesting females were encountered again in subsequent nesting seasons; one in 2003 and again in 2009 and one in 2006 and again in 2009.

In 2012 a saturation tagging programme was implemented in Juani Island, Mafia, during the two month peak nesting season (April and May). Teams of two people patrolled four nesting beaches and applied flipper tags (TZ series) to every female encountered. The tagging programme was repeated in 2013 and 2014. During the tagging programme in 2012, three females were encountered that had been tagged in previous seasons; in 2013, three females were encountered that had been tagged in previous seasons and in 2014 two females were encountered that had been tagged in previous seasons. One of the females encountered in 2014 was first tagged 10 years earlier in 2004.

The saturation tagging programme will continue in future years (subject to funding) to gather data on important population parameters including clutch frequencies, inter-nesting duration, levels of nest site fidelity and remigration intervals. Data will be used to assess the size and status of the nesting population.

Between 2005 and 2012, 31 green turtles were tagged in Temeke District with titanium flipper tags. 29 were nesting females, one was a non-nesting emergence. One was an injured turtle found stranded on a beach. The tags were applied after four months in a captive rehabilitation programme. She was found dead floating at sea four months later.

In 2013 a saturation tagging programme was implemented in Temeke District during the two month peak nesting season (April and May). Teams of two people patrolled eight nesting beaches and applied flipper tags (TZ series) to every female encountered. The tagging programme was repeated in 2014. During 2013, two turtles were encountered that had been tagged in 2010.

Between 2003 and 2009, 10 green turtles that were captured in gill nets in Mafia Island were tagged and released alive. One individual was captured a second time a month later and released unharmed. None of the other individuals have been encountered again.

Four hawksbill turtles were flipper tagged in 2003 after being captured in gill nets in Mafia island. None of them have since been encountered.

Most nesting females in Mnemba Island have been tagged with titanium flipper tags since 2001. Although some turtles may have been missed due to the closure of the lodge throughout April and May during the rainy season, data show that there are many individuals returning to Mnemba to nest in subsequent seasons.

Trawl and gillnet by-catch assessments have been done by Sea Sense in collaboration with TAFIRI, Duke University and WWF (Muir 2005b; St John and Muir 2006; Muir 2007b) and Frontier (Darwall 1996; Darwall and Coiseul 1996). Unfortunately, there is no estimate of the survival rates of live turtles released when incidentally captured.

3.1.6 Has research been conducted on the frequency and pathology of diseases in marine turtles? [INF, PRI]

☐ YES ■ **NO** ☐ UNSURE

The first cases of fibropapilloma were documented in 2010 but no research has been conducted.

3.1.7 Is the use of traditional ecological knowledge in research studies being promoted? [BPR, PRI]

■ **YES** ☐ NO ☐ UNSURE

Traditional knowledge of fishing communities has been used to assess nesting activity, marine turtle bycatch, use of marine turtle products and myths and values associated with marine turtles. Most studies were conducted using interview questionnaires.

Thiagarajan 1991
Clark and Khatib 1993
Khatib 1998
Ministry of Livestock and Fisheries Development, 2011. REPORT ON UNEP/CMS DUGONG QUESTIONNAIRE SURVEY IN TANZANIA.

3.2.1 List any regional or sub-regional action plans in which your country is already participating, which may serve the purpose of identifying priority research and monitoring needs. [INF]

In 2010 Tanzania participated in a regional satellite tracking training workshop in La Reunion under the South West Indian Ocean Fisheries Project. The workshop culminated in the identification of priority research activities in Tanzania including the implementation of the first ever satellite telemetry project in Tanzania.

In 2004, a WIO Region Marine Turtle Workshop was held in Kenya to bring together marine turtle experts and relevant stakeholders in research and conservation within the WIO region; share experiences and discuss networking options and opportunities; identify and prioritise regional turtle research and management needs; and draft a regional proposal to address research needs. The workshop proceedings were prepared by KESCOM (Muir 2005b).

Tanzania is the current vice chair of the Western Indian Ocean Task Force and is active in arranging and participating in meetings of the Task Force and planning activities related to the Task Force work plan. Tanzania is currently involved in organising a regional workshop to improve understanding of the socio-economic value of marine turtles in the region.

3.2.2 On which of the following themes have collaborative studies and monitoring been conducted? Use the text boxes to describe the nature of this international collaboration or to clarify your response. Answer 'NO' if the studies/monitoring undertaken do not involve international collaboration. [INF, PRI]

a) Genetic Identity ■ **YES** ☐ NO ☐ NOT APPLICABLE

Collaboration between Sea Sense, University of Dar es Salaam and the French Research Institute for Exploitation of the Sea, IFREMER (St John and Muir 2006).

In 2006, Tanzania collaborated with a number of countries in the region on a genetic stock assessment of green turtles in the South West Indian Ocean.

b) Conservation status ☐ YES ■ **NO** ☐ NOT APPLICABLE

c) Migrations ■ **YES** ☐ NO ☐ NOT APPLICABLE

Collaboration with Seychelles, Comoros, Mayotte, Mozambique, Kenya and South Africa on international flipper tag recoveries.

Tanzania collaborated with several countries in the region to carry out the satellite telemetry project under the South West Indian Ocean Fisheries Project.

d) Other biological and ecological aspects ■ **YES** ☐ NO ☐ NOT APPLICABLE

Tanzania participated in a regional study of marine turtle bycatch in 2007, funded by Project Global.

Marine turtle experts in Tanzania provided advice and practical assistance to turtle monitors in Vamizi Island, Mozambique, with particular reference to nest relocation protocols and marine turtle ecotourism.

☐ **Other**

3.3.1 List, in order of priority, the marine turtle populations in your country in need of conservation actions, and indicate their population trends. [PRI]

Foraging greens: population trend unknown
Nesting hawksbills: population trend unknown
Nesting greens: population trend unknown at most sites (nesting population in Mafia showing upward trend)
Foraging loggerheads, olive ridleys and leatherbacks: population trend unknown

(See Frazier 1976; Thiagarajan 1991; Clark and Khatib 1993; Slade 2000; Muir 2005)

Green turtle nesting populations in Mafia and Temeke Districts have been monitored for 13 and 10 years respectively. These locations are the two most important green turtle nesting sites on the Tanzanian mainland. In addition, data sets already exist for nesting behaviour and mortality in these two districts so there is considerable potential to use existing data to inform priority conservation actions.

Green and hawksbill (nesting and foraging) in Mnemba and Pemba Islands in the Zanzibar archipelago should also be prioritised for conservation action as these are significant offshore nesting sites that are threatened by high fishing pressure, subsistence harvesting and coastal development.

Marine turtle populations in southern Tanznaia (Mtwara and Lindi Regions) should be included for conservation actions as international flipper tags recoveries indicate that these areas may serve as an important foraging area and migrator corridor for loggerheads nesting in south Africa.

3.3.2 Are research and monitoring activities, such as those described above in Section 3.1 periodically reviewed and evaluated for their efficacy? [SAP]

☐ YES ☐ NO ■ **UNSURE**

3.3.3 Describe how research results are being applied to improve management practices and mitigation of threats (in relation to the priority populations identified in 3.3.1, among others). [SAP]

Nesting seasonality and nesting site data are helping to focus resources and improve efficiency of monitoring and nest protection as well as promote marine turtle ecotourism (Khatib 1998; Slade 2000; Muir 2004a; Muir 2005b).

Stranding data have enabled the identification of communities which interact with marine turtles regularly and they have been targeted for awareness and sensitisation activities.

Satellite telemetry work has identified a number of previously unknown green turtle foraging grounds which have been prioritised for habitat mapping and assessment of fishing pressure and bycatch rates.

3.4.1 Has your country undertaken any initiatives (nationally or through collaboration with other Range States) to standardise methods and levels of data collection? [BPR, INF]

■ **YES** ☐ NO ☐ UNSURE

Tanzania participated in a training workshop in La Reunion in 2010 where standardised methodologies relating to population abundance, recruitment and mortality were discussed. The importance of standardised data collection was emphasised including standardisation between countries, projects, field workers and years within a project.

Tanzania participated in a working group to develop a flipper tag recoveries database to be hosted by IOSEA.

In 2011 Tanzania investigated the possibility of adopting the TOORSOI database developed by IFREMER and Kelonia and this is still a possibility for Tanzania to work towards.

3.4.2 To what extent does your country exchange scientific and technical information and expertise with other Range States? [SAP, IND]

☐ OFTEN (SYSTEMATICALLY) ■ **OCCASIONALLY** ☐ RARELY ☐ NEVER

3.4.3 If your country shares scientific and technical information and expertise with other Range States, what mechanisms have commonly been used for this purpose? Comment on any positive benefits/outcomes achieved through these interactions. [INF]

Attendance at the International Sea Turtle Symposium, Western Indian Ocean Marine Science Association (WIOMSA) Symposium and Signatory State meetings; participation in WIO Marine Turtle Task Force meetings; contributions to Indian Ocean Turtle Newsletter and Africa Sea Turtle Newsletter; sharing information online via websites and social media sites; correspondence via email.

3.4.4 Does your country compile and make available to other countries data on marine turtle populations of a regional interest? [INF]

■ **YES** ☐ NO ☐ UNSURE

Tanzania is currently in the process of verifying all international flipper tag recoveries so that data can be shared on the new IOSEA database.

OBJECTIVE IV. INCREASE PUBLIC AWARENESS OF THE THREATS TO MARINE TURTLES AND THEIR HABITATS, AND ENHANCE PUBLIC PARTICIPATION IN CONSERVATION ACTIVITIES

4.1.1 Describe the educational materials, including mass media information programmes that your country has collected, developed and/or disseminated. [INF, PRI]

A diverse range of educational materials have been produced and distributed in coastal communities in Tanzania and in hotels and lodges including:

- Marine turtle species poster describing each species present in the WIO
- Brochure highlighting community based marine turtle research and conservation efforts in Mafia Island
- Poster highlighting threats to marine turtles and their habitats in Tanzania including egg poaching, habitat degradation, bycatch, plastic pollution, dynamite fishing
- Brochure publicising marine turtle ecotourism including when and where visitors can participate, Code of Conduct for hatching events, use of revenue generated by marine turtle ecotourism
- Poster advertising opportunities to participate in marine turtle ecotourism
- T-shirts, caps, khangas and stickers with marine turtle conservation messages
- Mass media campaign including live interviews on local and national radio, coverage of community events and workshops on national TV and press releases in national newspapers
- Video documentary about the marine turtle conservation work of Sea Sense NGO
- Illustrated 'comic' book with stories about marine turtle biology, threats to their survival, ecotourism, waste management, sustainable fishing
- Quarterly newsletter highlighting marine turtle conservation work carried out by Sea Sense NGO
- Marine turtle fact sheets (biology, behaviour and status in Tanzania)
- Plastic pollution fact sheets
- Marine turtle training manual detailing field methodologies and protocols for beach monitoring, collection of morphometric data from stranded specimens, flipper tagging, nest relocations, tissue sampling

4.1.2 Which of the following groups have been the targets of these focused education and awareness programmes described in above in Section 4.1.1? [PRI, INF]

■ **Policy makers**
☐ Fishing industry
■ **Local/Fishing communities**

☐ Indigenous groups
■ **Tourists**
■ **Media**
■ **Teachers**
■ **Students**
■ **Military, Navy, Police**
☐ Scientists
☐ Other:
☐ None of the above

4.1.3 Have any community learning / information centres been established in your country? [BPR, SAP]

☐ YES ■ **NO**

4.2 Alternative livelihood opportunities [IND, BPR] Describe initiatives already undertaken or planned to identify and facilitate alternative livelihoods (including income-generating activities) for local communities.

A network of a 33 community Conservation Officers has been established in six coastal districts in mainland Tanzania. Each of the Conservation Officers earns a monthly allowance for conducting a range of duties including beach patrols, nest relocations, monitoring of marine turtle strandings and awareness activities in their communities.

At each of the monitored sites, a nest incentive scheme has been established whereby villagers are paid a small financial incentive for reporting a nest to a Conservation Officer. Further incentives are paid for each hatchling that emerges successfully. At many of the nesting beaches, local fishers patrol the beaches early in the morning in order to earn regular income from the nest incentive scheme.

Marine turtle ecotourism initiatives have been established at three nesting sites in mainland Tanzania. Community Turtle Tour Guides have been recruited and trained and earn a monthly allowance for guiding visitors to nesting beaches. Half of all revenue generated through marine turtle ecotourism in directed back into 'Village Environment Funds' to support community development projects and ensure the wider community benefits from the initiative.

In 2013 a flip-flop recycling initiative was established in Mafia Island. Villagers collect discarded flip-flops from nesting beaches and recycle them into attractive handicrafts. The products are on sale at a number of outlets across Tanzania and the production team are earning a regular income from the project.

4.3.1 Describe initiatives already undertaken or planned by your country to involve local communities, in particular, in the planning and implementation of marine turtle conservation programmes. Please include details of any incentives that have been used to encourage public participation, and indicate their efficacy. [BPR, IND]

Local communities are fully involved in the planning and implementation of marine turtle conservation programmes, primarily through the establishment of a community Conservation Officer network which has full responsibility for nest monitoring and protection programmes, a marine turtle stranding network, flipper tagging programmes and awareness and sensitisation activities. Furthermore, local fishers participate in the annual flipper tagging programme in Mafia and Temeke Districts each year.

Local fisher associations known as Beach Management Units are becoming increasingly targeted for involvement in the planning and implementation of marine turtle conservation programmes that relate to fisheries e.g. bycatch monitoring, assessments of fishing pressure at known foraging grounds and the introduction of temporal and spatial closures.

4.3.2 Describe initiatives already undertaken or planned to involve and encourage the cooperation of Government institutions, NGOs and the private sector in marine turtle conservation programmes. [IND, BPR]

In October 2010 the national Tanzania Turtle and Dugong Conservation Committee (TTDCC)was established to oversee the conservation and management of marine turtles as part of Tanzania's commitment as a signatory state to the IOSEA and CMS/UNEP MoUs. The Committee is hosted by the Ministry of Livestock and Fisheries Development and is represented in the mainland by Fisheries Development Division, Marine Parks and Reserves Unit), Department of Environment Vice Presidents Office, Ministry of Natural Resources and Tourism, Tanzania Fisheries Research Institute, the Department of Aquatic Sciences and Fisheries (University of Dar es Salaam), WWF, Sea Sense and the Ministry of Livestock and Fisheries from Zanzibar. The Committee meets twice per year and has written funding applications, coordinated marine turtle surveys in data deficient areas and developed a national marine turtle awareness strategy. Members of the private sector (tourism and fishing industry) are co-opted into meetings as necessary.

Regular meetings are held between Sea Sense and the Fisheries Development Division (Ministry of Livestock and Fisheries) to share information on marine turtle conservation initiatives. In 2013, three staff from Fisheries Development Division participated in a green turtle flipper tagging project with Sea Sense.

The tourism sector is very involved in the implementation of marine turtle ecotourism in mainland Tanzania and Zanzibar. Hotels and lodges promote excursions to nesting beaches and liaise with community Turtle Tour Guides to arrange the excursions. Many of the lodges also elicit donations from their guests to support sea turtle conservation in Tanzania.

OBJECTIVE V. ENHANCE NATIONAL, REGIONAL AND INTERNATIONAL COOPERATION

5.1.1 Has your country undertaken a national review of its compliance with Convention on International Trade in Endangered Species (CITES) obligations in relation to marine turtles? [SAP]

☐ YES ■ **NO** ☐ NOT APPLICABLE

5.1.2 Does your country have, or participate/cooperate in, CITES training programmes for relevant authorities? [SAP]

☐ YES ☐ NO ☐ NOT APPLICABLE

5.1.3 Does your country have in place mechanisms to identify international illegal trade routes (for marine turtle products etc.)? Please use the text box to elaborate on how your country is cooperating with other States to prevent/deter/eliminate illegal trade. [SAP]

☐ YES ☐ NO ☐ NOT APPLICABLE

5.1.4 Which international compliance and trade issues related to marine turtles has your country raised for discussion (e.g. through the IOSEA MoU Secretariat, at meetings of Signatory States etc.)? [INF]

5.1.5 Describe measures in place to prevent, deter and eliminate domestic illegal trade in marine turtle products, particularly with a view to enforcing the legislation identified in Section 1.5.1. [INF]

In Tanzania, all species listed on Appendix I of CITES are officially protected. On the mainland, turtles fall under the responsibility of the Fisheries Division (Ministry of Livestock and Fisheries Development).

In the Tanzania Fisheries Regulations, 2009, there is provision for addressing the illegal domestic trade in marine turtles. Section 67 (1) of the Regulations states that a person shall not fish, possess, process, offer for sale, market or export marine turtles. In the case of a first offence, the fine is not less than TSh 200,000 or not less than a two year sentence or both, and in the case of a second and subsequent offence, the offender is fined not less than TSh 300,000 or a three year sentence, or both.

In 2014 a two day marine legislation seminar was held in Tanga Region marine to sensitise stakeholders in the law enforcement chain (marine police, police detectives, magistrates, prosecutors, District Legislation Officers, District Fisheries Officers) on the need to address domestic trade in marine turtle products. Relevant legislation was explained and discussed and a number of failed court cases were reviewed in order to assess enforcement gaps. Similar seminars are planned at three other locations in Tanzania later in 2014.

5.2.1 Has your country already developed a national action plan or a set of key management measures that could eventually serve as a basis for a more specific action plan at a national level? [IND]

☐ YES ■ **NO**

In October 2010, the national Tanzania Turtle and Dugong Committee was established which combines marine turtle conservation efforts on the mainland and in Zanzibar. One of the key objectives of the committee is to develop a national marine turtle action plan.

Recognising the need to address declining marine turtle populations in Zanzibar, a study was commissioned by the Department of the Environment in 1999 to develop a long-term strategy for marine turtle conservation. This resulted in a Turtle Recovery Action Plan for Zanzibar (Slade 2000). However, the recovery plan is now outdated and needs extensive review.

5.2.2 From your country's perspective, which conservation and management activities, and/or which particular sites or locations, ought to be among the highest priorities for action? [PRI]

Nest monitoring and protection in Mafia, Temeke, Pangani, Unguja (Mnemba) and Pemba (Misali)

Continuation of flipper tagging during the peak nesting season in Temeke and Mafia to determine population size and provide a basis for monitoring trends

In water work - habitat mapping, assessment of fishing pressure at known foraging grounds

Education and outreach - all along the coast

Enforcement - all along the coast

Bycatch reduction - particularly in the artisanal gillnet fishery

5.2.3 Please indicate, from your country's standpoint, the extent to which the following local management issues require international cooperation in order to to achieve progress. [PRI]

Illegal fishing in territorial waters	■ **ESSENTIAL** ☐ IMPORTANT ☐ LIMITED ☐ NOT AT ALL
Incidental capture by foreign fleets	☐ ESSENTIAL ■ **IMPORTANT** ☐ LIMITED ☐ NOT AT ALL

Enforcement/patrolling of territorial waters	■ **ESSENTIAL** ☐ IMPORTANT ☐ LIMITED ☐ NOT AT ALL
Hunting/harvest by neighboring countries	■ **ESSENTIAL** ☐ IMPORTANT ☐ LIMITED ☐ NOT AT ALL
Poaching, illegal trade in turtle projects	☐ ESSENTIAL ☐ IMPORTANT ■ **LIMITED** ☐ NOT AT ALL
Development of gear technology	☐ ESSENTIAL ■ **IMPORTANT** ☐ LIMITED ☐ NOT AT ALL
Oil spills, pollution, marine debris	■ **ESSENTIAL** ☐ IMPORTANT ☐ LIMITED ☐ NOT AT ALL
Training / capacity-building	☐ ESSENTIAL ☐ IMPORTANT ■ **LIMITED** ☐ NOT AT ALL
Alternative livelihood development	☐ ESSENTIAL ☐ IMPORTANT ■ **LIMITED** ☐ NOT AT ALL
Identification of turtle populations	■ **ESSENTIAL** ☐ IMPORTANT ☐ LIMITED ☐ NOT AT ALL
Identification of migration routes	■ **ESSENTIAL** ☐ IMPORTANT ☐ LIMITED ☐ NOT AT ALL
Tagging / satellite tracking	■ **ESSENTIAL** ☐ IMPORTANT ☐ LIMITED ☐ NOT AT ALL
Habitat studies	☐ ESSENTIAL ■ **IMPORTANT** ☐ LIMITED ☐ NOT AT ALL
Genetics studies	☐ ESSENTIAL ■ **IMPORTANT** ☐ LIMITED ☐ NOT AT ALL

5.3.1 Identify existing frameworks/organisations that are, or could be, useful mechanisms for cooperating in marine turtle conservation at the sub-regional level. Please comment on the strengths of these instruments, their capacity to take on a broader coordinating role, and any efforts your country has made to enhance their role in turtle conservation. [INF, BPR]

In the Western Indian Ocean region, considerable efforts have been made to promote regional collaboration and to address regional issues relating to marine turtle conservation. The Western Indian Ocean Marine Turtle Task Force is an essential mechanism to coordinate efforts. Tanzania is the current vice chair of the WIO MTTF and Tanzanian delegates attend all regional meetings and workshops.

Tanzania has submitted an application for the Rufiji Delta - Mafia Channel Complex to become a Site of Regional Importance to Marine Turtles under the IOSEA Sites Network initiative. The Sites Network has considerable scope to enhance regional coordination of marine turtle conservation.

5.3.2 Has your country developed, or is it participating in, any networks for cooperative management of shared turtle populations? [BPR, INF]

☐ YES ■ **NO** ☐ NOT APPLICABLE

5.3.3 What steps has your country taken to encourage Regional Fishery Bodies (RFBs) to adopt marine turtle conservation measures within Exclusive Economic Zones (EEZs) and on the high seas? [SAP]

5.4.1 Describe your country's needs, in terms of human resources, knowledge and facilities, in order to build capacity to strengthen marine turtle conservation measures. [PRI]

There is a need to conduct capacity building activities for both District Fisheries Officers and community based fisheries managers that includes training on strong leadership and governance, conflict resolution, reducing fisheries - marine turtle interactions and monitoring, control and surveillance activities.

There is also an urgent need to increase awareness of Tanzania Fisheries Regulations amongst government authorities including District Fisheries Officers, District Magistrates and Zonal Officers. These authorities all play an important role in either the enforcement of fisheries laws, the preparation of court cases against illegal fishers or the issuing of appropriate fines and penalties in accordance with national fisheries legislation, which provides protection for marine turtles and their habitats. Currently, the level of knowledge of laws protecting marine turtles and their habitats is low and there is poor understanding of how illegal fishing practices such as the use of beach seines, poisons or dynamite impact marine turtles and their habitats. As a result, illegal fishers are able to operate with impunity with little fear of apprehension.

The provision of working equipment such as motorized boats and motor cycles is also important to support enforcement patrols. A lack of equipment to conduct patrol and surveillance operations is hampering the effectiveness of 'closed areas' which may lead to BMUs abandoning temporal and spatial closures as a management strategy in the future. The declaration of closed areas by community based fisheries managers represents a major step forward in marine turtle conservation in Tanzania and demonstrates that there is increasing recognition that marine turtles are a valuable component of marine ecosystems.

5.4.2 Describe any training provided in marine turtle conservation and management techniques (e.g. workshops held, training manuals produced etc.), and indicate your plans for the coming year. [PRI, INF]

Sea Sense NGO has trained a network of over 60 community Conservation Officers in practical marine turtle conservation techniques including species identification from tracks, sexing and measuring marine turtles, nest relocations, predator control, assessments of hatching success, flipper tagging, deployment of satellite tags and tissue sampling. A training manual has been produced which describes field methodologies and protocols. The manual is currently being updated.

Staff from eight hotels and lodges have received training in marine turtle conservation, specifically focusing on nest relocations, monitoring during incubation periods, post hatching excavations and Codes of Conduct for hatching events and observing nesting females.

Gill net fishers in three coastal districts have received training in handling and releasing live turtles from fishing nets.

Staff from Marine Parks and Reserves Unit have received training in species identification, nest relocations, post hatching excavations and data collection and management.

5.4.3 Specifically in relation to capacity-building, describe any partnerships developed or planned with universities, research institutions, training bodies and other relevant organisations. [BPR]

Each year (since 2004) between two and four students from the Department of Aquatic Sciences and Fisheries, University of Dar es Salaam, undertake an eight week field attachment with Sea Sense NGO. They receive training in practical marine turtle conservation techniques, participate in surveys and research work and analyse marine turtle data.

5.5.1 National policies and laws concerning the conservation of marine turtles and their habitats will have been described in Section 1.5.1. Please indicate their effectiveness, in terms of their practical application and enforcement. [SAP, TSH]

Legislation related to marine turtles and their habitats is provided in the Fisheries Act 2003 and the Fisheries Regulations 2009. However, the legislation is inadequate in scope and does not include reference to the compulsory use of Turtle Excluder Devices (TEDs) in trawl nets and does not specify any critical habitats in marine waters (freshwater critical habitats are mentioned).

Zonal Officers from the Fisheries Development Division and District Fisheries Officers lack the capacity to effectively enforce laws relating to marine turtle conservation in Tanzania. Limited resources for monitoring, control and surveillance activities together with poor understanding of legislation pertaining to marine turtles and their habitats amongst the judiciary hampers practical application and as such, the law is rarely applied.

5.5.2 Has your country conducted a review of policies and laws to address any gaps, inconsistencies or impediments in relation to marine turtle conservation? If not, indicate any obstacles encountered in this regard and when this review is expected to be done. [SAP]

■ **YES** ☐ NO ☐ UNSURE

The 2005 Tanzania Fisheries Regulations were reviewed and revised in 2009. The 2009 Regulations addressed gaps related to marine turtle habitats. Provision was made to protect feeding, breeding and nesting grounds.

5.5.3 From the standpoint of law enforcement, has your country experienced any difficulties achieving cooperation to ensure compatible application of laws across and between jurisdictions? [TSH]

■ **YES** ☐ NO ☐ UNSURE

There is poor cooperation between different agencies involved in law enforcement e.g. District Fisheries Officers, marine police, prosecutors and magistrates. Many District Fisheries Officers lack sufficient training to collect and store evidence, manage witnesses or file comprehensive police reports. Although personnel are in place to assist with these processes, poor collaboration means that cases are poorly presented and are frequently rejected by the judiciary.

OBJECTIVE VI. PROMOTE IMPLEMENTATION OF THE MoU INCLUDING THE CONSERVATION AND MANAGEMENT PLAN

6.1.1 What has your country already done, or will it do, to encourage other States to sign the IOSEA MoU? [INF]

6.1.2 Is your country currently favourable, in principle, to amending the MoU to make it a legally binding instrument? [INF]

☐ YES ☐ NO ☐ NO VIEW

6.1.3 Would your country be favourable, over a longer time horizon, to amending the MoU to make it a legally-binding instrument? [INF]

☐ YES ☐ NO ☐ NO VIEW

6.2 Secretariat and Advisory Committee

6.2.1 What efforts has your country made, or can it make, to secure funding to support the core operations of the IOSEA MoU (Secretariat and Advisory Committee, and related activities)? [IND]

6.3.1 What funding has your country mobilised for domestic implementation of marine turtle conservation activities related to the IOSEA Marine Turtle MoU? Where possible, indicate the specific monetary values attached to these activities/programmes, as well as future plans. [IND]

The Government of Tanzania has mobilised funds from the World Bank (SWIOFP and MACEMP).

6.3.2 Has your country tried to solicit funds from, or seek partnerships with, other Governments, major donor organisations, industry, private sector, foundations or NGOs for marine turtle conservation activities? [IND]

■ YES ☐ NO

Funds have been mobilised though various international development agencies (DFID, USAID, EU) together with charities and foundations (Born Free Foundation, Fauna and Flora International) for implementation of marine turtle conservation activities. These funds are secured by and channelled through Sea Sense NGO. Sea Sense has also secured corporate sponsorship from the oil and gas sector.

6.3.3 Describe any initiatives made to explore the use of economic instruments for the conservation of marine turtles and their habitats. [BPR]

6.4.1 Has your country designated a lead agency responsible for coordinating national marine turtle conservation and management policy? If not, when is this information expected to be communicated to the IOSEA MoU Secretariat? [IND]

■ **YES** ☐ NO

Ministry of Livestock and Fisheries Development (Fisheries Development Division).

6.4.2 Are the roles and responsibilities of all government agencies related to the conservation and management of marine turtles and their habitats clearly defined? [IND]

☐ YES ■ **NO** ☐ UNSURE

6.4.3 Has your country ever conducted a review of agency roles and responsibilities? If so, when, and what was the general outcome? If not, is such a review planned and when? [SAP],

☐ YES ■ **NO** ☐ UNSURE

Comments/suggestions to improve the present reporting format:

Additional information not covered above: