MARINE TURTLE UPDATE

Recent News from the WWF Africa & Madagascar Marine Turtle Programme

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Number 1 – November 2004

In 2002 WWF launched a new Africa and Madagascar Marine Turtles Programme. Building on over 30 years of experience in marine turtle conservation, WWF's new initiative aims to provide strategic field interventions to help guarantee a future for these threatened species.

The long term goal of the programme (25 years) is: *Viable populations of all five species of Marine Turtles in African waters are conserved.*

The Programme has four targets

1. Loss and degradation of critical nesting, inter-nesting and foraging habitats reduced or prevented in at least eight key sites by 2010.
2. Measures to control unsustainable use and trade of marine turtles and turtle products enhanced in at least six countries by 2010.
3. Incidental capture of marine turtles reduced in the territorial waters of at least six countries and in at least two pelagic fisheries by 2010.
4. Capacity for monitoring, research and management of marine turtles and their habitats enhanced in at least eight countries by 2006.

For further information on the WWF African and Madagascar Marine Turtles Programme you will soon be able to check our website: http://www.panda.org/africa/marineturtles

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This edition of *Marine Turtle Update* was compiled and edited by Alison Wilson & Sarah Humphrey.

Marine Turtle Update provides recent news on the conservation work undertaken and supported by WWF in Africa and Madagascar to conserve marine turtles. The update is aimed at WWF staff and WWF's partners such as range state governments, international and national non-governmental organizations, and donors. It will be published at least once per year.

Cover Picture: Green Turtle, *Chelonia mydas,* caught by fishermen as accidental catch in their fishing nets. Zanzibar Island. Tanzania © WWF-Canon / Martin HARVEY

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Welcome!

Welcome to the first issue of the *Marine Turtle Update*, the occasional newsletter of The WWF Africa & Madagascar Marine Turtle Programme.

Five species of marine turtles are reported to nest on African beaches - the green (*Chelonia mydas*), the hawksbill (*Eretmochelys imbricata*), the loggerhead (*Caretta caretta*), the leatherback (*Dermochelys coriacea*), and the olive ridley (*Lepidochelys olivacea*) turtle.

Increasingly, human activities are threatening marine turtles, both directly (deliberate or incidental catch, egg collection, pollution) and indirectly (destruction or degradation of nesting and foraging habitats), and mitigating actions are urgently required to ensure their survival in Africa. Turtles are particularly vulnerable on shore and in coastal waters, where they are brought into close proximity with coastal dwellers, but high seas fisheries also pose a threat. All five species of marine turtles found in African waters are categorised on the IUCN Red List as endangered or critically endangered.

The major issues for marine turtle conservation in Africa and Madagascar are:

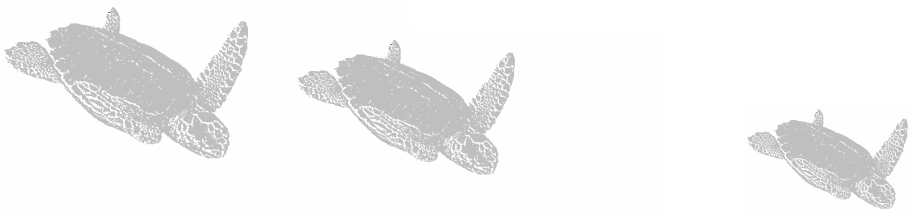
- Loss and degradation of nesting, inter-nesting and foraging habitats;
- Overexploitation of eggs, meat, carapaces and other products;
- Incidental capture by trawlers, gillnets and other fishing gears;
- Limited capacity to manage turtle populations.

WWF has supported marine turtle conservation in the Africa and Madagascar region since 1969. In light of the common threats to marine turtle populations highlighted above, it was considered appropriate to develop a regional strategy for marine turtle conservation in which WWF can play a specific and well-identified role under a programmatic approach. The AMP Subcommittee approved the development of the Africa and Madagascar Marine Turtle Programme (AMTP) in February 2001 and the Programme was established in May 2002.

The next few pages present some of the highlights of recent and ongoing work on marine turtles in WWF's three focal marine ecoregions – Eastern African marine Ecoregion (EAME), West African Marine Ecoregion (WAMER) and Western Indian Ocean Islands Maine Ecoregion (WIOMER) – and in the Gulf of Guinea.

We are grateful for the collaboration of many partners and for the support of WWF US, WWF Netherlands, WWF UK, WWF South Africa, WWF-New Zealand, NedBank, the EU, UNDP funds, IAATO and Southern Seabirds Solutions for the work described in this update. Born Free Foundation and the Body Shop Foundation are co-supporters of the turtle conservation work in Mafia.

Thanks to PJ Stephenson, Ste Drayton, and the WWF Global Species Programme for their help in producing this update.



Articles

Tracking Turtles in the West African Marine Ecoregion

In July 2004, WWF WAMER (West Africa Marine Ecoregion) organized a successful seven-day training workshop in Guinea-Bissau on the conservation and monitoring of marine turtles. The workshop was held in collaboration with the TOMAO (*Tortues Marines en Afrique de l'Ouest)* network and IUCN Guinea-Bissau. It was an excellent opportunity to gather together various regional actors and train them in conservation techniques using a very practical approach.

WAMER hosts populations of five marine turtle species: green *Chelonia mydas*, hawksbill *Eretmochelys imbricata*, loggerhead *Caretta caretta*, leatherback *Dermochelys coriacea*, and olive ridley *Lepidochelys olivacea*. All five species are categorised as endangered or critically endangered on the IUCN Red List. Two nesting sites in WAMER have been identified as being of Global Importance. The islands of Sal, Boa Vista and Maio, in Cape Verde, where an estimated 3,000 loggerheads nest annually, is thought to be the second most important nesting site for the species the whole of the Western Atlantic (Cape Verde is also known to harbour significant populations of juvenile hawksbill and green turtles). A second site of international importance is the islands of Poilão in the Bijagos Archipelago, Guinea Bissau, where an estimated 7,000-10,000 green turtles nest annually. The olive ridley nesting site on the island of Orango (now classified as a National Park) in the Bijagos Archipelago is thought to be of regional significance.

On-going tracking initiatives

Regular tagging in the sub-region would help clarify information on turtle migrations gained from satellite monitoring initiated in Guinea-Bissau by FIBA (*Fondation Internationale du Banc d'Arguin*). In 2001, seven green turtles were equipped with satellite tracking devices. The preliminary results of the satellite survey (Figure 1) show the migratory routes and feeding grounds of green turtles in the region, signifying the importance of a regional approach.

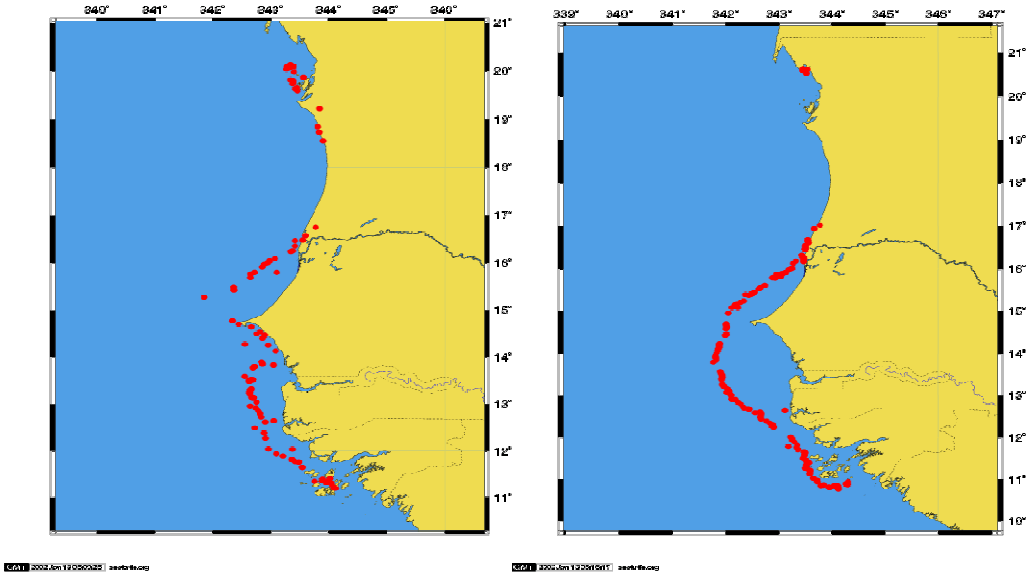


Figure 1. Migratory routes of green turtles in West Africa (FIBA, 2001)

In 2004, nine loggerhead turtles living around the Cape Verde Islands were fitted with satellite trackers by scientists from the University of Exeter, UK, and a local organisation, Natura 2000. Their journeys are tracked online at: http://www.seaturtle.org/tracking/index.shtml?project_id=26

Research and monitoring projects using Monel tags have already been initiated at Poilao (Guinea Bissau) and Boa Vista (Cape Verde). On Boa Vista 1,200 loggerhead turtles have been tagged (Monel and PIT, 2002) since 1999. On Poilao 4,000 turtles have been tagged since 1994 in collaboration with FIBA. However, the relative importance of satellite monitoring is underscored by the low rate of tag recoveries in the region.

The WAMER workshop

The specific objective of the workshop was to boost participants' knowledge of marine turtle biology and conservation techniques, and to promote greater consistency in methods of monitoring marine turtles. Particular emphasis was laid on ways to identify the species (and the different tracks each leaves on sandy beaches); techniques for measuring and tagging marine turtles; monitoring and conservation methodologies on nesting beaches; and the collection and recording of relevant data. Another key objective was to ensure that the participants would leave the workshop much better equipped to engage in capacity-building activities for marine turtle conservation in their home countries.

The workshop drew thirteen participants representing governmental and non-governmental organisations working in the management of marine and coastal areas in Guinea, the Gambia, Mauritania, Cape Verde, Senegal and Guinea-Bissau. They benefited from the invaluable knowledge of local IUCN staff, Natura 2000, and Tomas Diagne, the Senegalese marine turtle specialist.

Participants gave presentations on marine turtle monitoring in their respective countries. Pédro Lopez (Cape Verde) presented the results of monitoring nesting sites on three beaches in Boa Vista and gave a demonstration on the use of magnetic transponders which transmit an identification number which can be read by a portable handset. The advantage of this technique is that the animal never loses its ring (tag), but a major disadvantage is the cost of equipment. The data from such tagging programmes should be exchanged and coordinated regionally – a task for the TOMAO network.

Alpha Omar Jallow (the Gambia) presented the results of preliminary beach censuses, and an analysis of the potential of beaches for nesting turtles. This provides a baseline for future work. The Gambia is mainly a marine turtle feeding zone, but the Bijol Islands, which have been included in a protected area since 1993, harbour some nesting individuals.

Kadiatou Cissoko and Mah Soumah gave a progress report on marine turtle conservation of marine turtles in Guinea. There are still vast gaps in the knowledge of distribution and abundance of marine turtles and efforts to coordinate the programmes of conservation between countries are only just beginning. Nesting sites are found mainly on the islands of Loos, Sobanè, Goret, Tougnifilidi, Kountousadé, Khoundindé, Belair, Koukoudé, Böngölön, and Poukhoun, and on the islands of the Cape Verga. Their presentation initiated a discussion on biometric methods used in monitoring.

Castro Barboza (Guinea-Bissau) described his country's programme of marking marine turtles with rings of the Monel type. Overall, 4,764 turtles were ringed between 1993 and 2003. The long term aim is to determine the number of turtles in Guinea Bissau and to identify migration routes, concentration sites and feeding areas, issues which are as yet little known in West Africa.

Sall Mamadou Alassane (Mauritania) presented a species' inventory and the results of a study of the impact of traditional Imraguen fisheries on marine turtle mortality in the Banc d'Arguin. He presented data on 724 turtles sampled between 1997 and 2002 by a team of park "*enquêteurs*" using questionnaires. This presentation stressed the need for reinforcing capacities for identification, collection and data processing.

Bacary Diobaté (Senegal) described activities in the delta of Saloum Biosphere Reserve. These included a local awareness campaign and the long term monitoring of nesting beaches at Léba Island, Birds Island, Kossos, Senghor Island, Ansoukala, Fandiong, beach of Niodor, Pointe of Sangomar, and Pointe of Djakonsa. The data

covered information on nesting periods, clutch size and incubation periods. He stressed the need to reinforce the capacities of National Parks staff and field volunteers.
Another presentation by the IUCN staff related to the methodology of monitoring of turtles in the Poilao area of Guinea-Bissau, and also discussed satellite tracking methodology.

As well as taking part in presentations and debates, workshop participants visited local beaches for hands-on experience of conservation techniques such as identification, marking, and nest inventory. They were able to hone their identification skills further using the collection of marine turtle skulls and carapaces in the *Maison de L'Environnement* in Bubaque.

Having so many turtle experts from the region, the workshop was also a good venue to brainstorm on the revival of the TOMAO network. A key recommendation was that each country should draft a national strategy on marine turtle conservation, within the framework of the West African Marine Ecoregion Action Plan for marine turtle conservation, which was drawn up in 2002.

In addition, participants identified nine priority actions for implementing the Action Plan. These are to:

- Create a regional database;
- Launch a booklet giving practical guidelines on the monitoring of marine turtles (available from December 2004);
- Inventory the important sites ;
- Initiate a regional tagging programme;
- Inventory the number of turtles killed by artisanal and industrial fishing ;
- Inventory the other threats on marine turtles;
- Engage local communities in conservation activities;
- Stimulate co-operation and coordination between the regional States;
- Secure sustainable financing for the marine turtle conservation programme.

From 16-17th December 2004, a meeting will be held in Dakar to launch the implementation of the Marine Turtle Action Plan for the region. "We urge each West African country concerned to implement the national priority actions outlined in the Action Plan" says WWF's Arona Soumare. "This will help both marine turtles and coastal communities".

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Tagging demonstration at the WAMER workshop
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Community-based Marine Turtle Conservation in Tanzania

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The waters around Mafia Island in Tanzania harbour fringing coral reefs, sheltered patch reefs, algal reefs, seagrass beds, mangrove stands, and intertidal flats. Its coral reefs are some of the most beautiful on the East African coast. An area of 820 km^2 around southern Mafia, including several smaller islands, was designated as the Mafia Island Marine Park (MIMP) in 1995. It hosts five species of marine turtles - green, hawksbill, olive ridley, loggerhead and leatherback. Only green and hawksbill turtles have been observed nesting. Fishing and tourism are the main source of income for the islands' people.

When the park was established, WWF began working with local authorities and communities to implement a management plan. Destructive dynamite fishing, prolific in the 1980s and early 1990s, has been successfully eliminated and coral mining has declined significantly, but the marine environment is still under threat, particularly from fishers originating from outside the Park.

WWF's activities there include: assisting the development of a 10-year strategic plan; promoting community involvement in enforcing park regulations through village liaison committees; creating alternative income sources such as seaweed farming, bee-keeping and mariculture; demarcating a system of 'user zones' for fisheries, tourism and forest resource use; promoting sustainable fishing gear amongst resident fishermen; establishing village-level monitoring of marine resource use; and conducting research.

A community-based endangered species and habitat protection programme, initiated in January 2001, aims to promote the long-term survival of marine turtles and dugongs in the MIMP through proactive community participation, training, public awareness, research and monitoring. The programme is funded by WWF, the Born Free Foundation and the Body Shop Foundation, and operates in collaboration with the Mafia District Council (Natural Resources and Education Offices), the Mafia Island Marine Park, and local communities.

A Green turtle (Chelonia mydas), accidentally caught in fishing gear, is released into the Indian Ocean by fishermen under WWF supervision. Mafia Island, Tanzania

© WWF-Canon/Peter DENTON

Since 2001, when monitoring began, 536 marine turtle nests have been recorded on Mafia (524 green; 12 hawksbill) with the successful hatching of 30,819 young turtles. Monthly nesting frequency for green and hawksbill turtles since January 2001 (Figure 2) shows that green turtles nest throughout the year peaking during the cooler, south-east monsoon months between March and June. Hawksbill nests have only been recorded between December and April.

Nesting activity is now also being monitored in 5 districts on the mainland: Temeke (approximately 60km of coastline south of Dar es Salaam), Mnazi Bay – Ruvuma Estuary Marine Park (MBREMP) in Mtwara (near the

border with Mozambique), Pangani, Bagamoyo and Mkuranga.

To date, 20 marine turtles rescued from fish traps or gillnets have been tagged (titanium tags) in Mafia and Mtwara. Thirty-two tags have been returned from turtles that had nested in Kenya, the Seychelles, Comoros Islands, Mayotte and South Africa: this shows the importance of Tanzania's rich coastal and marine habitats as turtle foraging grounds. Analyses of DNA samples from 50 turtles will provide information on population stocks and migration patterns and help to improve our understanding of turtles in the western Indian Ocean.

In order to gauge the extent of the threat posed by local fisheries, gillnet fishers have been encouraged to record incidental catches of marine turtles. This activity is in its early stages, but to date three gillnet crews on Mafia are providing invaluable monthly data on turtle catches. Under a 'Nest Protection Incentive Scheme', local villagers who report and protect a nest receive an initial incentive of US$3, and a further incentive averaging US$7 when the eggs hatch. Over 300 nests have been reported and protected by local community members on Mafia since the programme began four years ago.

In 2004, the scope of the programme was extended to include the entire Tanzanian coastline (excluding the islands of Zanzibar where similar conservation activities are on-going). Based out of Dar es Salaam, conservation and research activities are now underway at some of the key sites along the coast, covering about one-third of the potential nesting beaches. Nineteen local village Turtle Monitors have been elected and partnerships have been developed with local district authorities, tour operators and private investors. The programme is also providing input to the national Tanzania Turtle Conservation Committee to produce a national turtle strategy and action plan and to meet Tanzania's commitments to conserve and manage marine turtles and their habitats through the international Convention on Migratory Species.

For additional information on WWF's work on Mafia Island, contact:

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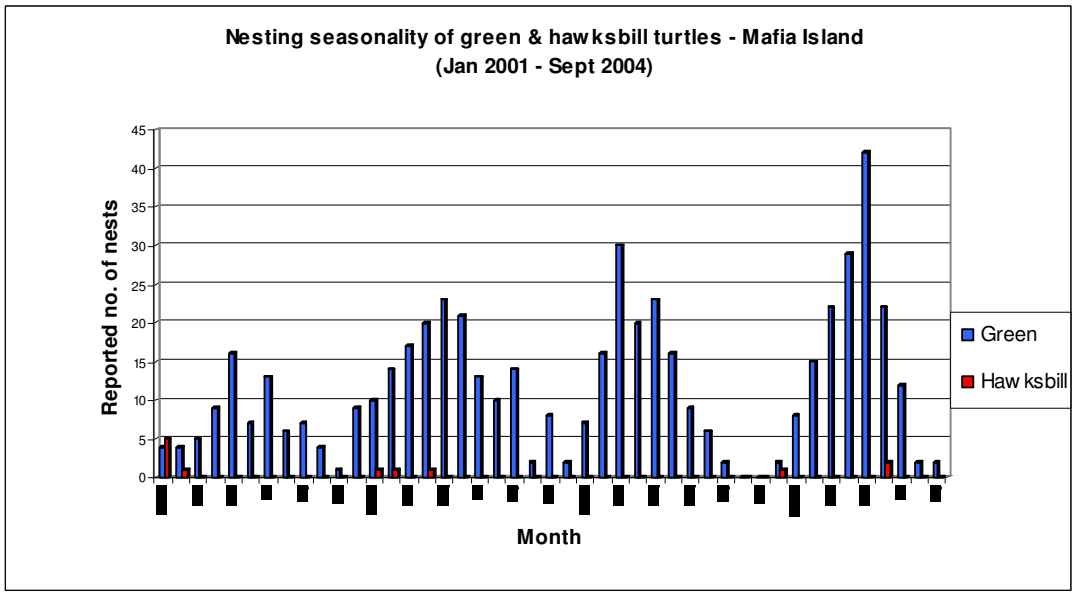

Figure 2. Turtle nesting seasonality between January 2001 and September 2004, Mafia Island

New Havens for Marine Turtles in Mozambique

The creation in 2001 and 2002 of two new marine protected areas in Mozambique is a critical milestone in global marine conservation. Hailed as *Gifts to the Earth* by WWF, these bold initiatives by the Government of Mozambique also promise exciting new opportunities to conserve marine turtles and other precious resources along the country's 2,700 km long coastline.

Extension to Bazaruto Archipelago National Park

WWF and a local partner, the Endangered Wildlife Trust, have worked with the government of Mozambique since 1989 to protect the Bazaruto Archipelago. In 2001, this work led to the enlargement of the Bazaruto Archipelago National Park (BANP) from 600km^2 to 1,400km^2. The Government of Mozambique recently extended full protection to the whole National Park.

Bazaruto's low-lying sandy islands harbour a variety of sand dune, freshwater and coastal forest habitats, but the archipelago's crowning glory lies in the range of tropical marine ecosystems found there. Spectacular coral reefs, rich pelagic waters and extensive sea-grass beds support all five of the marine turtle species found in the Western Indian Ocean as well as the largest and only viable dugong population along the eastern African coast.

Located in the Mozambique Channel 500 km north of Maputo, the islands received some measure of formal protection in 1971 when three were declared a national park. The 2001 extension means that BANP is now the second largest marine protected area in Eastern Africa (after the Quirimbas) and among the largest in the Indian Ocean.

WWF is working with local communities in the BANP to identify, monitor and protect marine turtle nesting sites. This effort is taking place within a national framework for marine turtle protection undertaken by the Mozambique Marine Turtle Working Group, a group of institutions and individuals including WWF, the European Union, Eduardo Mondlane University, CESVI/FNP (a consortium of an Italian organization and Forum Natureza em Perigo, a Mozambican NGO), Centro Terra Viva, (an environment and advocacy NGO), IUCN, and MICOA (the Ministry of Environment). The national tagging programme involves the purchase of tags and applicators, training, and the establishment of a databank based in CESVI/FNP headquarters. More than 1,500 tags and 16 applicators have been purchased, and around 750 tags distributed to areas such as Maputo Special Reserve, Macaneta Beach, the BANP and the nearby Vilankulos Sanctuary.

Quirimbas National Park

The Quirimbas Archipelago in Cabo Delgado Province is a chain of 28 islands stretching northwards almost 400 km from near the city of Pemba to the town of Palma close to the Tanzania border. The area has long been recognised as an area of great scenic beauty, global biodiversity significance, and important historical heritage. Its relative under-development also represents an opportunity for attracting tourists.

Before the Park was declared, inshore fisheries - extremely important in terms of the provincial economy and the survival of the Muani people and culture - were on the verge of collapse, due in large part to an influx of fishermen from overfished areas elsewhere. On land, conflicts between farmers and animals such as lion and elephants, and the erosion of traditional livelihoods through crop disease and soil erosion, had led to extreme poverty.

The Quirimbas National Park (QNP) is unique in that it was created, in March 2002, in response to requests from local communities and other stakeholders who realized that their livelihoods depended on the wise management and conservation of their natural resources. The southernmost eleven islands of the Quirimbas Archipelago and a vast expanse of mainland forest are included in the new park, giving it a total area of some 7,500 km^2. The park's 1,500 km^2 marine area includes shallow coastal habitats and the offshore seamount of Banco São Lázaro. It provides feeding and/or nesting grounds for marine turtles, dugong, dolphins, and a number of species of shark and whales.

The Park's preliminary management plan, enthusiastically embraced by local communities and approved by District authorities, includes the concept of marine Total Protection Zones and community co-management of the fisheries resource. All communities have agreed to cede some of their areas (on land and sea) for conservation and tourism. The zoning plans are already starting to bear fruit: in 2004 fishermen of Quissanga District, interviewed on national radio, stated that fishing had improved noticeably since the since the installation of a nearby pilot marine protection zone. Another sanctuary has recently been established on Ibo Island.

In addition to €1.065 million provided by WWF, the Government of France has pledged €4.2 million in support of the QNP's establishment. The project will be implemented by WWF under an agreement soon to be signed with the Government of Mozambique. As part of the project, the national programme of marine turtle monitoring undertaken by the Mozambique Marine Turtle Working Group will be extended to include the QNP. The results of this effort will be reported in future issues of WWF's Marine Turtle Update.

Community Conservation in the Primeiras and Segundas

Under a new partnership with WWF, local communities in Mozambique's Primeiras and Segundas Archipelago are protecting marine turtle and sooty tern (*Sterna fuscata*) nests. The islands of the archipelago stretch along the coast from the towns of Angoche in the north to Pebane in the south.

Both turtle and seabird eggs were previously harvested for sale in Angoche. However, local people are in negotiation with the authorities to have the archipelago declared a protected area and encourage tourism. The area is one of the country's most important nesting sites for green turtles, but loggerheads and hawksbill nests are also found. Since April 2004, fishermen on Njovo and Puga-Puga Islands have set up committees to preserve both terns and turtles, and rangers selected by the local community are taking turns to patrol the islands. The community rangers were trained by others from the new Quirimbas National Park, with support from WWF and the Homeland Foundation, USA. WWF is planning to extend these activities to other islands of the archipelago and to assist the tagging and monitoring of marine turtles as part of the national programme.

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Local communities are ensuring Primeiras e Segundas becomes a haven for turtles and terns
© WWF Mozambique

TEDs Today, Turtles Tomorrow in Mozambique

In October 2003, Mozambique's Council of Ministers approved legislation making Turtle Excluder Devices (TEDS) compulsory in trawl nets. The new law, which will take effect from January 2005, applies to all motorized fishing vessels in Mozambique waters. The Government's action followed a WWF Panda Passport campaign, launched in February 2003, when hundreds of letters were sent to relevant Ministers urging them to prevent further losses of turtles.

Mozambique is exceptional in East Africa in that all five species of marine turtles found in its waters also come ashore to nest. Shallow coastal areas such as Sofala Bank, rich in sea grasses, are prime feeding grounds for green turtles making them especially vulnerable to bycatch in the shrimp fishery. A 2001 study undertaken by WWF[1] calculated that shallow water shrimp trawlers operating in Sofala Bank catch between 1,932 and 5,436 marine turtles every year. These deaths will be prevented by installation of TEDs on the trawl nets - a simple and inexpensive operation which is welcomed by Mozambican boat owners.

Experimental trials of TEDs on Sofala Bank during the 2001 study showed that installation of the larger size TEDs, now recommended by specialists, has no impact on the shrimp catch per unit effort. The TEDs also reduced bycatch of other large animals such as rays and objects such as rocks. This effect that may improve quality of the catch, leading in turn to an increase in sale prices.

Threats from long-line fisheries

Shrimp trawl fisheries are not the only threat to Mozambican turtles; illegal long-line fisheries are undoubtedly adding to turtle mortality. In late 2002, tourists reported dozens of carcasses of green and loggerhead turtles washed up on the beaches, including in the Bazaruto Archipelago National Park (BANP), a globally outstanding marine protected area celebrated as a Gift to the Earth in the presence of President Chissano. Most of the stranded turtles had been beheaded; others had had their throats cut.

The dead turtles were bycatch victims of illegal and unlicensed long-line fishing vessels which operate close inshore, including within the BANP. The boats, probably of Chinese, Korean, or Taiwanese origin, use long-lines to catch sharks (which are protected in Mozambican waters) to supply the lucrative shark fin market in East Asia. They deploy steel cables up to 25 km long set with baited hooks at one metre intervals. These hooks are particularly lethal for loggerhead and leatherback turtles which swallow the bait, and then drown or are killed by fishermen cutting away this unwanted and incidental catch. But the findings of numerous beheaded green turtles suggest even these normally vegetarian turtles are being impacted.

The gruesome toll of dead turtles killed by long-liners in 2002 was a trigger for WWF's successful Panda Passport campaign, which however focused on the introduction of TEDs in trawl fisheries as a readily actionable issue. The problem of illegal longline fisheries is more difficult to address. However, despite limited resources, the Mozambique Government has taken action: in May 2003 the Mozambican Navy hit an illegal fishing vessel operating in their waters with a bazooka. The vessel survived, with no reported injuries, but apparently had to be towed away. A military team is now based in Bazaruto park headquarters and is taking a variety of actions against the illegal fishers. Thanks to active campaigning by WWF, surveillance and fisheries enforcement is now high on the agenda in meetings between the Ministries of Defence and Fisheries

TEDS help fisheries as well as turtles

TEDs will not only protect marine turtles but will also allow Mozambique producers to enter the US market, which requires shrimp exporters to be certified as TED users. In August 2004, a US delegation visited Mozambique with a view to assist in the introduction of TEDS. The delegation met with Mozambique's Ministry of Fisheries, the

[1] Gove, D., Pacule, H., and Gonçalves, M. (2001). The Impact of Sofala Bank (Central Mozambique) Shallow Water Shrimp Fishery on Marine Turtles and the Effects of Introducing TED (Turtle Excluder Device) on Shrimp Fishery. WWF East Africa Marine Ecoregion publication

private sector involved with shrimp fisheries, and WWF. *"It looks likely that Mozambique shrimp fisheries may become certified as of May 2005",* James Story of the US Department of State said at the time. He added that the US State Department and the US National Marine Fisheries Service of the Department of Commerce would be willing to re-visit Mozambique in 2005 to work with local institutions to implement the new legislation.

WWF Mozambique's Helena Motta, says "We are supporting the Department of Fisheries in producing the guidelines on TEDs and hope that the introduction of TEDs goes smoothly when the next fishery season opens. There is a good chance that the shrimp fishery will become certified for export to the USA, as this new market represents an excellent incentive to the industry".

The action by Mozambique is likely to stimulate similar responses in other countries of the region, notably Madagascar.

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TEDs demonstration in Mozambique, facilitated by the US National Marine Fisheries Service

Turtle Monitoring and Community Development in KwaZulu Natal, South Africa and southern Mozambique

Forty-one years after monitoring of marine turtles in northern KwaZulu Natal and southern Mozambique started in 1963; this has become the longest-running quantitative programme on loggerhead and leatherback turtles in the world. It is also one of the first programmes to demonstrate the successful "recovery" of marine turtle populations under rigorous protection. Nesting turtles have been tagged with flipper tags since 1963, hatchlings have been notched since 1971, and the project has been broadened in recent years to include the satellite tagging of adults to determine their movements away from the Maputaland Coast.

The programme, currently sponsored by WWF South Africa's Green Trust (funded by Nedbank), aims to protect and monitor the size and distribution of two populations of nesting turtles in South Africa and southern Mozambique. Due to increasing pressure from tourism and local human populations on nesting beaches, it has been necessary to step up protection on the beaches to prevent disturbance, the destruction of nests and killing of turtles while ashore.

The field component of this programme commences each year on the 20th October and ends on the 15th March the following year. Staff of Ezemvelo KZN Wildlife, a provincial governmental organisation, are on site from 15 October. Between 14 and 21 temporary field rangers (depending on the availability of funds) are recruited from the local community and trained in identification, measuring, recovering, record keeping, tagging and handling. These field rangers are then deployed over 56 km of coast within the Maputaland Marine Park, patrolling the beaches on a daily basis. For many of them, the four months of employment represents their only cash income.

Data obtained by the monitors, along with tagging data collected from one tour operator, is collected daily by the Maputaland Zone officer, and send to the research station, where students update the database. A programme coordinator compiles an annual report at the end of the season, which includes an evaluation of the turtle population status, the number of tags returned from places outside South Africa, and numbers of turtles caught in the shark nets for that year. The report is generally distributed to all the donors, participants and interest groups.

The responsibility for protection and monitoring has hitherto been with the conservation authorities. However, voluntary compliance could be achieved if the public is better informed about the vulnerability of marine turtles and included in the conservation effort. The monitoring project is therefore set to expand, and one of the most important aspects of the next year's programme is to undertake a feasibility study to include a larger component of the public without compromising the integrity of the data. To this end, time will be spent discussing alternative methods with a broad group of stakeholders to gauge their interest. Options include the training local tourism operators and community members as turtle guides, concession turtle tours taking place in the north of the Greater St Lucia Wetland Park, and expansion of the project to southern Mozambique.

It will also be important to gain broad acceptance of the change in strategy and data collection methods from both the local public and the international community, since it is the longest running quantitative dataset against which other programmes can be measured. The current training of turtle monitors will be formalized into a course structure with a particular syllabus and assessments of competence. Responsibility of all of these aspects will reside with EKZNW.

A subregional workshop (including Mozambique) took place in November 2004 to discuss developing these ideas and to debate how the monitoring programme can develop a degree of self-sustainability through community involvement.

"We are realistic that these conservation activities will never be totally self-sufficient" says WWF South Africa's Deon Nel, "But if we can develop a model that helps local communities and allows certain elements of the monitoring programme to be funded through arrangements with tourism concessionaires, I think we will have won something for everyone".

Other expected project outputs include evaluation and acceptance of a new management plan to monitor and protect Maputaland turtles at the International Sea Turtle Conference to be held in February 2005. It is also hoped that a South African marine conservation programme will be presented at the IOSEA (Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South East Asia) MoU meeting in Bangkok in March 2005, with the acceptance of South Africa as a signatory state.

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Marine Turtle Research in Gabon

The Gamba Complex of Protected Areas in Gabon is an ideal place for long-term monitoring of marine turtle nesting sites. Its long, pristine beaches harbour high numbers of nesting leatherbacks (*Dermochelys coriacea*) and olive ridleys *(Lepidochelys olivacea*), and occasionally some green turtles *(Chelonia mydas*) and hawksbills (*Eretmochelys imbricata*). WWF has been working on turtle monitoring and protection in Gabon over the last four years.

In the 2002 – 2003 turtle nesting season, which goes from October to March, a pilot study within the Gamba Complex was carried out by WWF, Ibonga (a local environmental education NGO active in the Gamba Complex) and the EU-funded Central African marine turtle protection programme PROTOMAC (set up following the implementation of the international Abidjan Agreement on sea turtle protection for African countries along the Atlantic Ocean).

In 2003-2004, monitoring continued with the technical assistance of a Dutch environmental NGO called Biotopic which focuses on marine turtle research in Suriname and Gabon. The study[2] was undertaken in close collaboration with PROTOMAC

The aim of the study was to make a first estimate of the number of marine turtles nesting on a six km long beach close to the city of Gamba and in the vicinity of an oil terminal. This beach was chosen for several reasons. Firstly, marine turtles were known to nest there. Secondly, its proximity to Gamba means that nesting females and their eggs are vulnerable to poachers, while at the same time offering the possibility to show turtles to tourists and visitors. Finally, the Shell oil terminal situated at the north-west end of the beach could provide clues as to the impact on marine turtles of the oil industry in the Complex. The main goals of this study include improved understanding of local marine turtle ecology, and initiating cooperation with Ibonga and other stakeholders.

Research methods

In 2002-2003, on the beach each day at dawn, a team of five people (4 local team members and one expatriate WWF volunteer) counted new turtle tracks from the night before. From 2003 onwards field supervision for the research was provided by at least one person from Biotopic/WWF to 5 local people (including a university graduate during the ongoing season). The team measured the width of each track, and identified the features characteristic of each species, and then they looked for signs showing whether the females had laid eggs. The number of tracks for each species, with and without laying, was recorded.

Each night, the team patrolled the entire site to identify individuals. Female leatherbacks were double tagged with Monel tags (style 49) pinned on the skin-fold joining the hind limb to the tail. Hard-shelled turtles, (Cheloniids) were double tagged on the forelimbs. In 2003-2004 the Passive Integrated Transponder (PIT from TROVAN) tagging method was introduced exclusively for the leatherbacks. PIT tagging allows a more accurate population size assessment, because of the high loss rates of conventional flipper tags occurring with leatherbacks. Biometric data was gathered for each female. The team also collected any other significant data such as occasional strandings or turtle carcasses left on the beach.

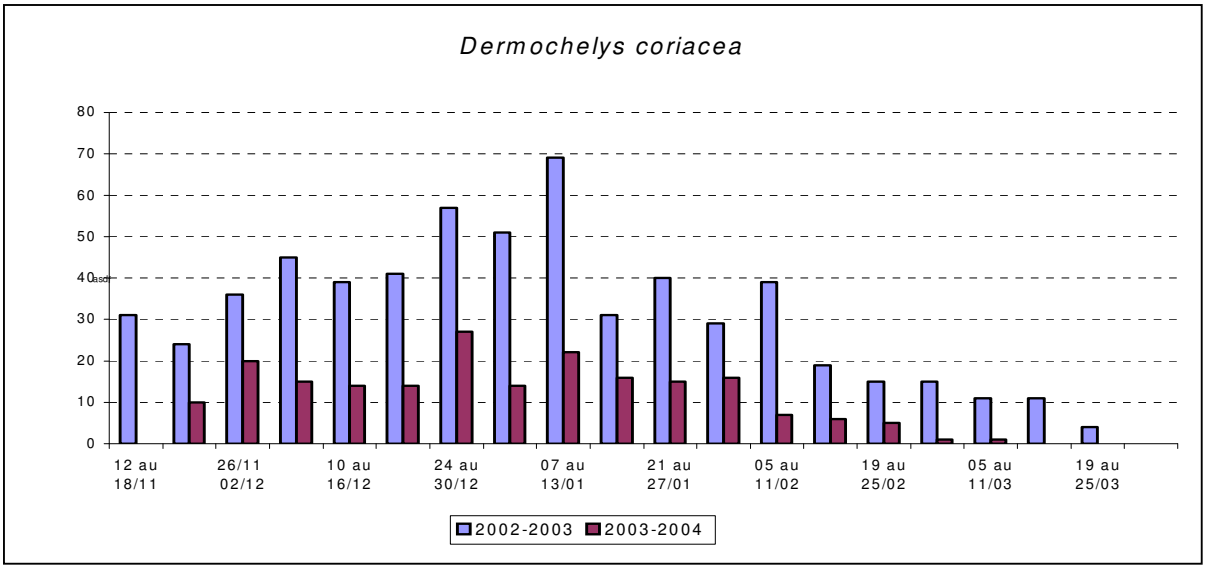
Project Results

Between November 12, 2002 and March 31, 2003, 607 nesting tracks of leatherbacks were recorded (25 without nesting) together with 71 nesting tracks of olive ridleys (3 without nesting). The number of leatherback tracks peaked in early January, whereas olive ridley tracks peaked in late November and early December. No tracks could be seen in the last week of March and apart from one, the last tracks of olive ridleys were recorded just after mid-January. In the 2003/2004 season a drop of 66% in the numbers of nesting leatherbacks was observed, so only 203 leatherback nests were found. For the olive ridleys a decline of 28 % resulted in only 51 nests.

During the 2002/2003 season, 325 leatherbacks were tagged against 61 in the 2003/2004 season. Only 9 olive ridleys were tagged in 2003/2004 against 24 in the season before. This year (2004-2005 season) already 13 olive ridleys and 8 leatherbacks were tagged in the first week (15-22 November)! So promising results are expected for the coming season.

[2] Korthorst, M. and S.B. Verhage (2004). Marine Turtle research in the Gamba Complex of Protected Areas, Gabon, Central Africa, 2003-2004. Biotopic.

Figure 3: Comparison of observed total number of leatherback (Dermochelys coriacea) nests per week at Pont Dick, Gabon during seasons 2002-2003 & 2003-2004



No tagged olive ridleys were observed during the first season and one in the second year, but 45 leatherbacks were seen once, 4 twice and 2 three times in 2002/2003. Only 16 leatherbacks were recaptured in 2003/2004. The period between two observations of individual leatherbacks enabled a first estimate of the interval (about ten days) between two nestings, although the number of observations was limited (n=59).

What comes next

The results of the pilot study will be used to develop a conservation strategy for the coming years, which will include further monitoring, studies on population dynamics (includes tagging), education, and capacity building. The pilot survey gave a first evaluation of the nesting frequency of marine turtles, but because females do not come to nest every year, it needs to be continued for several more years, and on a greater number of sites, in order to assess the nesting population. The authors of the report on the pilot study recommend evaluating the nesting frequency of sea turtles on a representative sample of the entire Gamba Complex, during the next nesting season, in order to determine which beaches are most frequented. As well as counting tracks and identifying females, nests should be marked and analysed after the emergence of hatchlings so as to evaluate hatching success through the season. It would also be interesting to set up a few nests with temperature recorders to calculate the sex-ratio (which depends on temperature) of the hatchlings on the site.

Activities of the Gamba Programme in 2005

The partners of the Gamba Marine turtle programme continue their research and monitoring to improve understanding and knowledge of the status, life histories and threats to marine turtles in the area, in order to ensure a regionally coherent approach to conservation management. A second field camp 20 km south of Sette Cama will improve knowledge of the total numbers of marine turtles visiting the Gamba Complex and the threats they face, and help to deter poachers. More daily patrols and the involvement of the Ministry of Water and Forests will improve law enforcement: experience shows that one of the best ways to assure effective and long-term surveillance in protected areas is to ensure that highly motivated ecological monitoring teams are “filling the area with conservation eyes and ears”.

Trovan ID100 and Monel tags are being used to identify individuals and migration of individuals and ARGOS satellite trackers will be used to determine migration routes. Regional collaboration on tagging and data sharing is very important and will be promoted. The research camp will function as a Turtle Information Centre and provide guided tours. An important aspect of the work

will be to train local people to participate in research and conservation activities, and to intensify environmental education activities in cooperation with Ibonga through the 'adoption' of nests and school projects. A hatchery is just being made to be able to monitor hatch success and to show hatchlings to school classes who are not able to come out at night to see the adults nesting.

The programme is set to go 'high tech' by using an innovative CyberTracker technology, promoted and implemented in Central Africa by an EU-funded regional program based in Gabon (the Cybertracker Monitoring Program), This technology will ensure much easier and faster data collection, transfer and analysis, while automatically linking the collected data to a GIS database. The CyberTracker field computer ("visor") is designed to be quick and easy to use in the field, even by non-literate users. In addition, a user-friendly interface developed for PalmOS handheld computers linked to a GPS allows field workers to record hundreds of detailed observations per day.

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CyberTracker Field computer

Project Previews

WWF Mozambique Targets Illegal Curios

The illegal sale of marine turtle curios (carapaces, stuffed turtles and 'tortoiseshell' products), protected mollusc shells and corals to tourists in Mozambique is being targeted by WWF in a new campaign called "Wanted Alive!"

The campaign was launched in June 2004 and the target audiences are primary and secondary school students in Maputo City, decision makers, enforcement departments and civil society in general. Its long-term objectives include increasing public awareness, changes in legislation, reducing the curio trade in turtle products, improving marine turtle protection in the wild, and developing a proposal for a new list of protected marine species in Mozambique.

More than 16 schools and 600 students are involved in the campaign so far. Leaflets have been distributed and a number of public discussions have been held. In the coming year the campaign is to increase its activities in Maputo, promoting workshops and public debate, and developing articles for the local media. The campaign will be extended to include cities such as Pemba and Nampula where the curio trade is even more active.

Contact: Helena Motta, WWF Mozambique

Two-year Bycatch Study Begins in Southern Africa

A two-year study of bycatch of threatened seabirds, sharks and marine turtles in longline fisheries in the Benguela Large Marine Ecosystem (BCLME) began in 2004. The partners in this exercise include WWF, BirdLife-South Africa, Namibia's Biodiversity Programme, and Angola's *Instituto de Desenvolvimento da Pesca Artesanal*.

The overall aim of the study is to assess and reduce levels of bycatch, and the project's objectives include training Fisheries Observers, raising levels of awareness of the problem, and undertaking trials of effective mitigation measures which can be voluntarily adopted by fisheries. The project is sponsored by the BCLME Programme (from UNDP

funds), WWF-South Africa, WWF-New Zealand, IAATO (International Association of Antarctic Tour Operators) and Southern Seabirds Solutions.

Longline fishing vessels operating in the Benguela ecosystem target hake, tuna, swordfish and sharks. South African longline fisheries set about 34 million hooks in South African waters, while in Namibia about 24 longline vessels fish demersally for hake and a further 21 vessels target tuna, billfish and sharks. At present it is not known what Angola's longline capacity is.

Nothing is currently known about the bycatch of marine turtles in the BCLME but leatherback and loggerhead turtles, both present in the ecosystem, are particularly vulnerable to bycatch in longline fisheries elsewhere in the world and it is thought that populations of olive ridleys and leatherbacks would be at particular risk due to their pelagic habits and relative abundance along the Angolan coastline.

The problem of bycatch in Southern Ocean ecosystems has prompted urgent global action. For example, the United Nations FAO has developed two International Plans of Action (IPOAs), one addressing the incidental mortality of seabirds in longline fisheries and the other on the conservation and management of sharks. Furthermore, international agreements and Memoranda of Understanding (MOUs) have been developed under the Convention for Migratory Species (CMS) that specifically address the issue of bycatch of seabirds and marine turtles. These include the Agreement of the Conservation of Albatrosses and Petrels (ACAP), the MOU on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia and the MOU concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa.

However, despite this high level of commitment by the international community, knowledge of the extent of the problem and the use of inexpensive mitigation techniques remain low in developing countries. At present, most vessels in the BCLME are operating in the absence of formal enforcement systems.

The implementation of mitigation measures therefore rests with the fishermen themselves and it is imperative that the nature and scale of the problem is effectively communicated to the fishermen. This project will help to raise awareness through the collection of verifiable data that can help in the practical management of these fisheries.

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KESCOM surveying trade in turtle products

Populations of marine turtles in the Western Indian Ocean are continuing to decline, with human pressures and illegal offtake in the form of poaching of turtle meat, eggs and oil accounting for approximately 85% of turtle mortalities. Moreover, fisheries statistics and data collected by KESCOM (Kenya Sea Turtle Conservation Committee) indicate that between 54-75% of all turtles caught in artisanal fisheries are either slaughtered for home consumption or traded. The national research programme estimates that from 10% to over 50% of nesting females, and a similar percentage of nests are poached every year.

Reduced fish catches locally are further exacerbating the problem: with little opportunity for alternative livelihoods, fishers see no value in conserving turtles and those caught in nets become 'part of the catch'. The main markets appear to be in Bodo, Msambweni, Kilifi, Malindi, Ngomeni, Kipini, Mpeketoni, and the Lamu Archipelago in the north coast.

Consumption of turtle meat and other products appear to be on the decline in Mkokoni and Kiunga, thanks to an aggressive public education and awareness campaigns by WWF, an incentive scheme in the form of direct (mainly cash) payments, and indirectly through employment. However, in other areas cash incentive schemes have failed due to high black market prices for turtle products. Enforcing existing laws against the sale of turtle products is greatly hampered by lack of capacity and resources. Further, national legislation is inadequate to protect foraging as well as the nesting habitats and penalties for violation are weak.

The overall aim of a new KESCOM project is to provide information for decision-makers to develop a regional strategy for the conservation of marine turtles in Eastern Africa. The project, which was launched in June 2004, will achieve this by pursuing the following objectives;

- Identifying gaps in existing baseline information (including historical) on trade and utilization of sea turtle products;
- Building and utilizing local capacity for long-term trade data collection and monitoring;
- Developing a national database on trade in marine turtles and sharing this data with national institutions responsible for action;
- Determining the structure and organisation of the trade in marine turtle products.
- Recommending strategies to help reduce the impact of trade on the conservation and management of sea turtles and sharing them with responsible institutions for action;
- Disseminating project results.

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Malagasy Shrimp Fisheries Aid in Turtle Monitoring

A new WWF initiative in Madagascar is involving industrial shrimp trawl fisheries in tagging and monitoring marine turtles accidentally caught as by-catch.

The project is supporting the Malagasy Shrimp Fishing and Farming Association (GAPCM) to implement the monitoring programme. Before monitoring started, teams of shrimp fishers were trained on appropriate methodologies. And several turtles have been tagged already (using tag series numbers MAL0001 to MAL4501). Fishermen have also reported several turtles with South African tags on turtles they have captured and released – including a loggerhead tagged when it nested in KwaZulu/Natal in 1998/99. At the end of the first shrimp-fishing season, participating teams were awarded certificates to thank them for participating.

The monitoring project set up within the framework of a programme supporting the sustainable management of shrimp fisheries in Madagascar: one component of this programme is environmental protection leading to shrimp fisheries eco-certification. The project will also assist in assessing the feasibility of deploying TEDs on Malagasy shrimp vessels.

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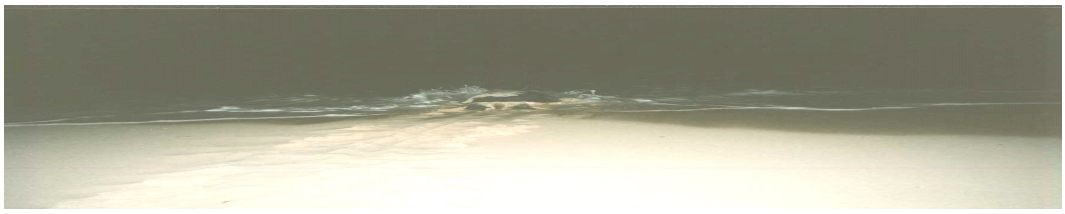

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