

Comhshaol, Oidhreacht agus Rialtas Áitiúil  
Environment, Heritage and Local Government

Report to The National Parks and Wildlife Service on  
Turtle Protection and Related Activities in and around Mayumba  
National Park, Gabon, 2008 - 09 Nesting Season  
(Contract Ref D/C/265)



Wildlife Conservation Society (WCS)  
Aventures Sans Frontiers (ASF)  
Mayumba National Park

June 2009

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## EXECUTIVE SUMMARY

The sea turtle nesting beach at Mayumba is the most important leatherback rookery in Africa, and probably the world. With such an abundance of turtles visiting Mayumba, it is perhaps inevitable that the local human population has learned to utilize turtle products (meat and eggs). While this has little impact at a simple subsistence level, the commercialization of bushmeat hunting and egg collecting is a major menace to sea turtle numbers. In addition to terrestrial threats, turtles also face dangers from the sea. The most important of these is currently illegal or uncontrolled fishing. Turtles are swept up in trawl nets, drowned in static nets, or taken as by-catch in the deep water long-line fishery. Additionally, oil pollution reaching the shore may leave a thick lethal barrier between the sea and the upper beach where hatchlings emerge from their nests.

This project primarily concerns the direct protection and monitoring of the nesting beach. However, this patrol effort has direct and indirect ‘knock-on’ effects in reducing other threats, which are an integral part of our whole turtle project. This report concentrates principally on patrol and monitoring efforts, but also includes sections on related activities that were either directly or indirectly connected to beach patrols. This season, these included a new study on nest survival, where a sub-sample of leatherback nests were followed throughout the incubation period, and the fate of the eggs analysed.

The main results of the 2008/2009 season are highlighted below.

- Over 3200 kilometers of patrols were conducted between October 2008 and April 2009 by staff operating from 2 camps within Mayumba National Park.
- Support from the National Parks and Wildlife Service assured that an additional 15km of critical nesting beach was also patrolled.
- As a result of these patrols, no incidents of nest raiding or hunting were reported from the research sections of the beach, and incidents on other sectors were reduced.
- Patrol teams contributed to long-term monitoring of turtle visitation rates in Mayumba. Data were then provided to the Gabon Turtle Partnership, which will analyze the nesting season at a national level.

- Information generated by beach teams facilitated the launch of 4 sea missions against illegal fishing vessels in the Mayumba area and led to the confiscation of illegal catches.
- Patrols teams continued their surveillance for oil pollution coming ashore during the nesting season. Fortunately this year was free of such incidents.
- Patrol teams gave logistical support to the project's satellite turtle tracking program. Data from this endeavor are now being used to justify a seasonal extension to Mayumba National Park that would better protect turtles between consecutive nesting events in the same season.
- The project was a leading partner in organizing Gabon's first ever at-sea Turtle Excluder Device trails. As a result of this work, we anticipate the eventual fitting of the entire Gabonese shrimp fleet with TEDs.
- Turtle conservation education activities this year extended beyond the bounds of Mayumba, and included the organization of 4 major events across the country to celebrate the newly established National Turtle Day. Meanwhile our usual school and village visits program continued to present turtle conservation in a fun and engaging manner throughout the season.

At a time when frontline conservation funding is increasingly difficult to secure, the support of the Irish Government through the National Parks and Wildlife Service has been of vital importance in ensuring effective protection for Africa's most important leatherback nesting beach. While the monitoring work enabled as a result of this support is of central importance in long-term conservation planning and the detection of population trends, beach patrols to prevent hunting, egg collection, and losses through illegal fishing bycatch lie at the heart of this project. We sincerely hope that this partnership can be continued through the 2009/10 nesting season, to ensure full protection and monitoring continuity for this most important turtle population.

## Introduction

### *Site description*

The town of Mayumba is situated in the extreme south of Gabon, on the Atlantic coast of central Africa, approximately 84km from the international border with Congo. The coastline between the town and the border is wild, exposed and in a relatively pristine state, due to a low human population, poor transport infrastructure, and the recent inclusion of the coastline within Mayumba National Park (created in 2002). The park protects 60km of coastline in Gabon, and is contiguous with the marine sector of the Conkouati-Douli National Park in Congo, creating a trans-frontier protected area covering approximately 120km of beach and 2000km<sup>2</sup> in total. The exposure of this coast, and the lack of human disturbance have contributed to it being among the 2 most important sites in the world for the nesting of Leatherback turtles (*Dermochelys coriacea*), and the most important site in Africa. The beach is also used as a nesting site for olive ridley turtles (*Lepidochelys olivacea*) and more rarely, green turtles (*Chelonia mydas*). In addition to being a turtle nesting beach of high global significance, the waters off Mayumba are used by up to 10% of the world's humpback whales each year during their breeding migration into the Gulf of Guinea from the Southern Ocean. Rays, sharks and dolphins are present within the park, including the rare and threatened humpback dolphin (*Sousa teuszii*). Finally, the waters off Mayumba have traditionally supported a rich coastal fishery. Due to uncontrolled industrial fishing, these resources are now greatly depleted, and the basic protein source for many coastal people is under threat.

### *Turtle presence in the Mayumba area*

The IUCN lists leatherbacks (*Dermochelys coriacea*) as Critically Endangered due to fishery-induced mortality, combined with over-exploitation at the nesting beaches. Decades of monitoring have detected significant reductions in Pacific nesting populations, with an estimated decline of 95% in 20 years (Spotila et al. 2000). Comprehensive data are available only for few well-studied populations, and we do not have adequate long-term assessments of large leatherback rookeries in the Atlantic, such the Gabonese one. The scarcity of information on size, status and threats for this important population makes it very difficult to estimate overall survival probability for the leatherback in the Atlantic and worldwide.

However, recent research suggests that Gabon may host the largest leatherback nesting population in the world, and that the highest nesting density is found on a 130 km stretch of

beach across the Gabon-Congo border, between Mayumba and Conkouati. A preliminary study based on three aerial surveys of the coastline carried out in 2003 by WCS estimated that approximately 1,000-1,500 nests are laid on an average night on Gabonese beaches during the peak month of the nesting season. A rough extrapolation suggests at least 30,000, and perhaps as much as 50,000 leatherback nests per season along Gabon's 850 km coast. PROTOMAC's research estimated that approximately 30,000 nests were laid just along Mayumba's 96.5 km beach during the 1999-2000 nesting season (Billes et al. 2000). For comparison, Hilberman and Goverse (2002) estimated 30,000 nests in Suriname in 2001, 15,000 in French Guyana, and a total of approximately 50,000 in Suriname, French Guyana and Guyana combined. The global leatherback population estimate of 34,500 nesting females (Spotila et al. 1996) significantly underestimated the size of the Gabonese population at 5,000 adult females (calculated from Fretey & Girardin 1988). Revising the global figures using a conservative Gabonese estimate of 30,000 nests per season, or approximately 15,000 adult females in the population (based on 5 nests per female and a renesting interval of 2.5 years), Gabon's leatherbacks could represent as much as 30% of the global population and are therefore critical for the survival of the species.

#### *Turtle team objectives in Mayumba*

The following list briefly summarizes the principal objectives for the marine turtle work in Mayumba during 2007/08.

- 1) Ensure sufficient basic infrastructure (especially transport) to support turtle conservation and related activities in the Mayumba coastal sector.
- 2) Continue, and develop turtle monitoring activities.
- 3) Protect turtle nesting beaches from egg collectors and/or turtle hunters.
- 4) Launch new nest success study to determine actual levels of hatching and predation/egg loss.
- 5) Reduce and eventually eliminate illegal industrial fishing from the sector, thus greatly reducing turtle mortality as 'by-catch'. Also, to work towards the implementation of turtle excluder devices (TEDS) on trawl nets.
- 6) Ensure regular surveillance of beaches for oil pollution, and work with government and industry to limit the risks of hydrocarbon pollution and other oil industry impacts on marine and coastal species and ecosystems.

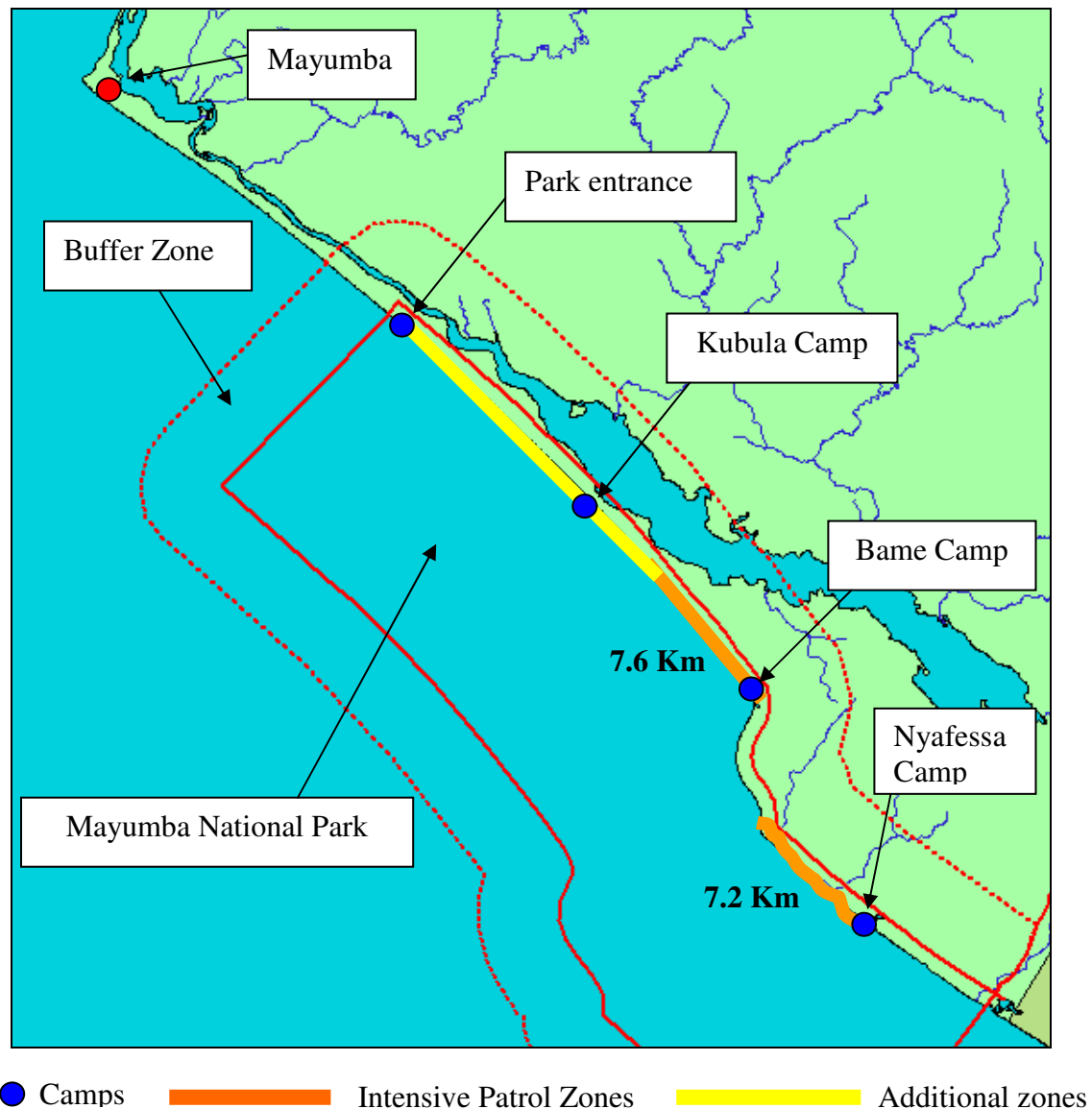
- 7) Continue satellite tracking project to determine turtle movements between nesting events and during post-nesting migration.
- 8) Undertake a conservation education campaign in local schools to promote turtle awareness.

## Patrol and Monitoring Methods

Teams were drawn from experienced turtle patrol members from ASF during past years, and members of the WCS/Mayumba National Park 'ecoguard' team. During early September 2008, WCS and the 'Gabon Turtle Partnership' held its second annual three-day training event in the town. Trainers from Italy, Gabon, and the United Kingdom once again taught classes on patrol methodology, the use of standardized data collection sheets, measuring turtles, correct tagging methods, the collection of genetic material, and the reporting of dead or injured turtles. Following the training, teams entered the field at the allotted time for the start of the season at each site.

The sections of the beach most heavily monitored and protected by our teams are shown in the following map. These were the same as those targeted in the previous season, in order to ensure the validity of yearly comparisons of turtle numbers. Whenever possible, turtle patrol teams also covered areas of beach to the North of Kubula Camp in order to deter nest poaching. The project vehicles also conducted patrols over the beach in the north of the park and its buffer zone, using the project car and quad bike.

**Figure 1:** Map of Study and Patrol Beaches for 2008-2009 nesting season.



Patrols were generally divided into two distinct categories:

- 1) Nocturnal patrols – usually began between 22:00 and 02:00; these were designed for the tagging of females during nesting (using monel metal tags), the measuring of turtles and collection of any genetic material desired, and of course deterring any presence on the beach by nest raiders or turtle hunters.
- 2) Daytime patrols – these were conducted during daylight hours, mostly either on the return patrol back down the beach following the upward nighttime patrol, or heading out onto the beach between 06:00 and 09:00. Team



members counted fresh turtle tracks of all species, and noted any other signs of interest or concern (turtle or nest predation, human disturbance, presence of oil pollution or illegal fishing vessels etc.

Each afternoon, following the patrols, the rough checksheets of data were copied neatly onto fresh sheets and stored securely. These were removed each month by WCS staff and immediately entered into the digital database of the project.

Any sign of human presence on the beaches was investigated immediately and tracks followed to determine which path had been used to gain access to a beach. In this way the village from which a person had come could be ascertained, and questions asked. Persons found on the nesting beaches were generally questioned on the spot, their names and addresses recorded and their photograph taken. Due to the permanent presence of teams on the research beaches, no nest raiding or hunting was observed in these sectors during the season.

## Activity Report

### *Patrol Effort*

The two camps of 'Bame' and 'Nyafessa' were staffed throughout the 2007/2008 nesting season. Patrol activities began on the 30<sup>th</sup> September 2008, and the season was formally ended on the 4<sup>th</sup> April 2008. Thus a total of 187 days presence on the nesting beaches was assured. Presence in the field is shown in Table 1 below.

All patrols were executed in the context of either nighttime live turtle censuses, or daytime nest counts. In total, 1415 kilometers of nighttime patrol were executed, while daytime patrols accounted for 1845 kilometers, giving a total patrol distance of 3260 kilometers. A breakdown of patrol effort is given in Table 2. The average number of persons at each camp was 2.5, thus the total number of 'man-kilometers' patrolled was 8151 km.

**Table 1: Season length and patrol effort**

	Bame				Nyafessa			All Zones
	Turtle marking patrols	Daily tracks counts	Nest success study	Total	Turtle marking patrols	Daily tracks counts	Total	Total
Start Date	3 Dec 08	3 Dec 08	6 Dec 08		30 Sept 08	30 Sept 08		
End Date	28 Feb 09	31 Mar 09	4 April 09		31 Jan 09	27 Feb 09		
Number of days at camp				<b>117 days</b>				<b>254 days</b>
Number of patrol days	82	113	114	<b>309 patrols</b>	110	137	<b>247 patrols</b>	<b>556 patrols</b>
Patrol Effort (# of patrols x ave # persons on patrol)	164	169.5	342	<b>375.5 man days</b>	220	205.5	<b>425.5 man days</b>	<b>1101 man days</b>

**Table 2: Patrol data for both camps for the entire 2008-2009 nesting season.**

	Night patrols			Day patrols			Both Zones
	Bame	Nyafessa	Total (km)	Bame	Nyafessa	Total (km)	Total (km)
<b>Distance per person</b>	623.2	792	<b>1415.2</b>	858.8	986.4	<b>1845.2</b>	<b>3260.4</b>
<b>Distance x av # persons</b>	1558	1980	<b>3538</b>	2147	2466	<b>4613</b>	<b>8151</b>

As mentioned, additional patrol coverage was given throughout the season to the areas around Kubula Camp and at the Parc Entrance. Turtle patrol personnel presence at these sites was 50 and 49 days respectively, and added a further 20km to the total area patrolled.

#### *Nest counts*

The total of 519 turtle nesting attempts were counted in the Bame and Nyafessa sectors during the 2008/09 season. This included nests from Leatherbacks and Olive Ridley's. Of these 35 (6.7%) were 'false crawls' – turtle tracks that led up the beach but did not show

evidence of a nest having been made. In a further two examples, it was impossible to say with precision if a nest had been made or not. Thus the number of actual nests counted was 482, a staggering three and a half times fewer nests than were recorded in the previous 07/08 season over the same area (1727). Due to the team's patrol efforts, none of these nests were subsequently raided by human egg gatherers. No effort was made to protect these nests from natural predators, but a subset was closely monitored to gauge natural losses and nest survival.

### *Biometrics*

During night patrols, 65 leatherback turtles were marked and measured. The average 'shell' length was  $151.7 \pm 7.3$  cm (min 137, max 171cm). The average leatherback back length was  $108.5 \pm 5$  cm (min 100, max 120cm).

Fourteen olive ridley turtles were measured: Average carapace length =  $70.6 \pm 2.4$  cm (min 66cm, max 75cm). Average carapace width =  $71.1 \pm 2.5$  cm.

For each patrol site (Bame and Nyafessa) data were collected on each species of turtle noted as present. In order to examine nesting rates and trends, we look first at Leatherback nesting.

### **Leatherback turtles**

#### *Number of nests - Bame*

The total number of nesting attempts of Leatherback turtles in the Bame sector (7.42km) was 343. Of these, 15 (4.4%) were false crawls and 2 were undetermined, thus giving a total of 326 true nests.

#### *Number of nests – Nyafessa*

At Nyafessa, 96 leatherback nesting attempts were recorded, of which 9 (9.4%) were false crawls, thus giving a total of 87 true nests. False crawls are not included in any subsequent analysis of nest data.

#### *Nest-site position*

The position of each genuine nest was noted as being either on the beach itself (On sand) or in the vegetation at the top of the beach (In vegetation). In addition, all nests on the beach were noted as being either above the high tide line or below it.

In the Bame sector, 18 of the 326 leatherback turtle nests (6%) were situated below the high water mark, and were therefore at risk from fatal flooding (see nest survival study).

Of the remaining 308 nests, 286 (87%) were made between the high water mark and the pioneer vegetation at the top of the beach, while 22 nests (7%) were made in and amongst the vegetation. These nests are considered to be the safest from flooding or beach erosion, and generally have the greatest chance of producing living hatchlings. The hazardous journey taken by those hatchlings through the vegetation in search of the sea is likely, however, to put them at increased risk of predation or disorientation leading to overheating, dehydration and death.

At Nyafessa, 6 of 87 nests (7%) were made beneath the high tide line. The coastline in this sector this year did not permit nesting in the vegetation zone, as most of the beach was lined either by lagoon edge or forest trees. The remaining 81 nests (93%) were situated in the sand between the high tide line and the forest or lagoon edge.

### **Olive Ridley turtles**

At Bame 12 olive ridley tracks were encountered, with no false crawls. It should be noted however that the delayed start of intensive patrols at this site will have resulted in some nesting attempts having been missed. At Nyafessa, 68 olive ridley tracks were recorded. Of these, 11 (16.2%) were false crawls.

Nest site position is here recorded with data from both sites combined. This is due to the overall low number of nests recorded this season. Of 88 olive ridley nests 92% were made in the dry sand zone, while 4% were each made respectively below the high tide line and in the vegetation zone at the head of the beach.

## **INTER-ANNUAL COMPARISON OF TURTLE NEST NUMBERS**

After protecting the nesting beaches from egg raiding and hunters, the primary goal of beach monitoring is to follow long-term trends in turtle numbers. These data give us a window into turtle migration patterns, and may also reveal any increase or decrease in the Atlantic population. Typically data of this type on such a long-lived species must be gathered over

many years before trends can become apparent. It is not uncommon for turtle researchers to record years of extremely high nesting numbers followed by very poor years. The reasons for these anomalies are still unknown, but it is clear that considerable data will be required before overall pronouncements can be made regarding the health of the population. In this report, we compare the 2006/07, 2007/08, and 2008/09 seasons.

In order for comparisons to be justified, the data must first be reduced to comparable units. In this study, we have chosen to express number of nests by firstly reducing the daily nest count to the number of nests per kilometer (i.e., dividing the total day's nest count by the distance patrolled (which was constant). We then established 14 day measuring periods, counted from the 1<sup>st</sup> January. Thus the first 14 days of the calendar year are given as 'Period 1, and the final 14 days, as Period 26, and so on. We chose 14 day periods instead of 7 days periods as in some cases too much data would be lost due to too small a sample size for averages to be calculated. Thus the 14 day period trades in the extra precision of a 7 day period for the capacity to keep more data in the calculation overall.

The final step was to calculate the average number of nests per kilometer for each 14 day period. Given the nature of the data concerned, only medians and non-parametric statistics can be considered. These medians can then be expressed solely for the year in question in order to examine the timing of nesting across the season, or used to compare between years.

The data presented below attest to a continued dramatic reduction in nesting leatherback turtles over the three study years.

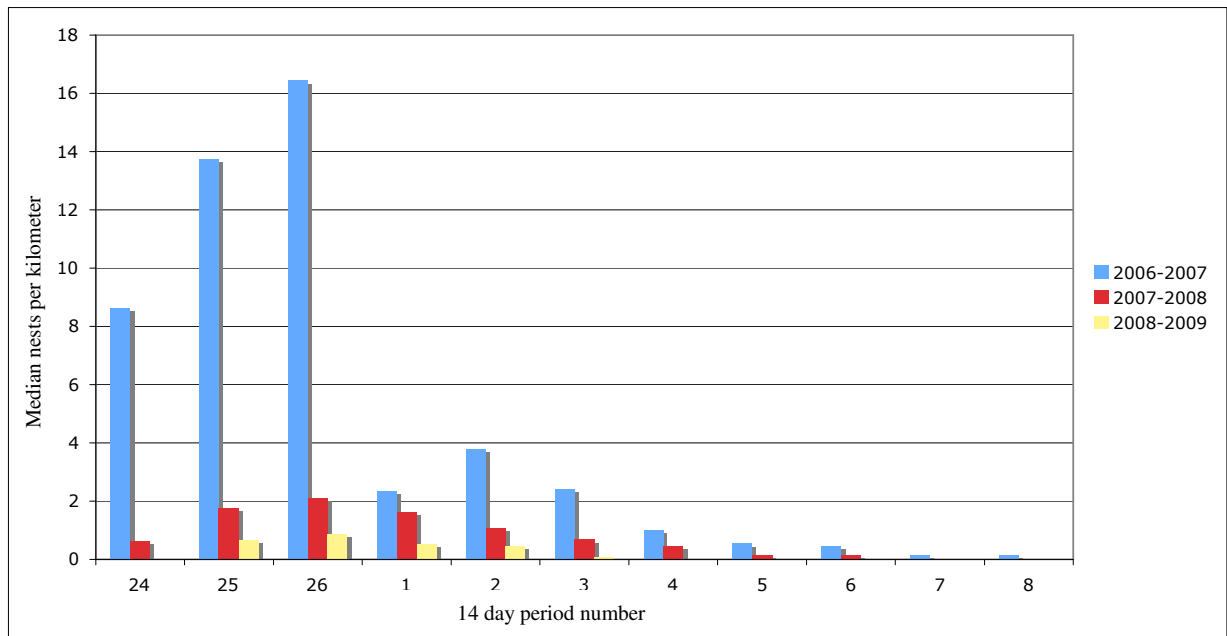
#### *Leatherbacks: Bame*

As Figure 2 clearly shows, the median number of leatherback nests made at Bame per kilometer and 14 day period shows a reduction over the last three seasons. Most notable was the massive reduction reported last season with regard to the drop in numbers compared to the 2006/2007 season, especially in the first 3 periods of the season. While the order of the reduction between the current season and the last is generally less marked, the trend this season is still resolutely downward.

This season's data confirm the peak of nesting as the final 14 days of December. The data also show that a reduction of nest numbers is accompanied in each season with a shortening

of the effective ‘nesting season’. Such turtles as did reach the Gabon coast this season, did so over a much reduced time period from the previous seasons.

**Figure 2:** Comparison of median leatherback nest numbers for each 14 day period of the season at Bame, over 3 years.

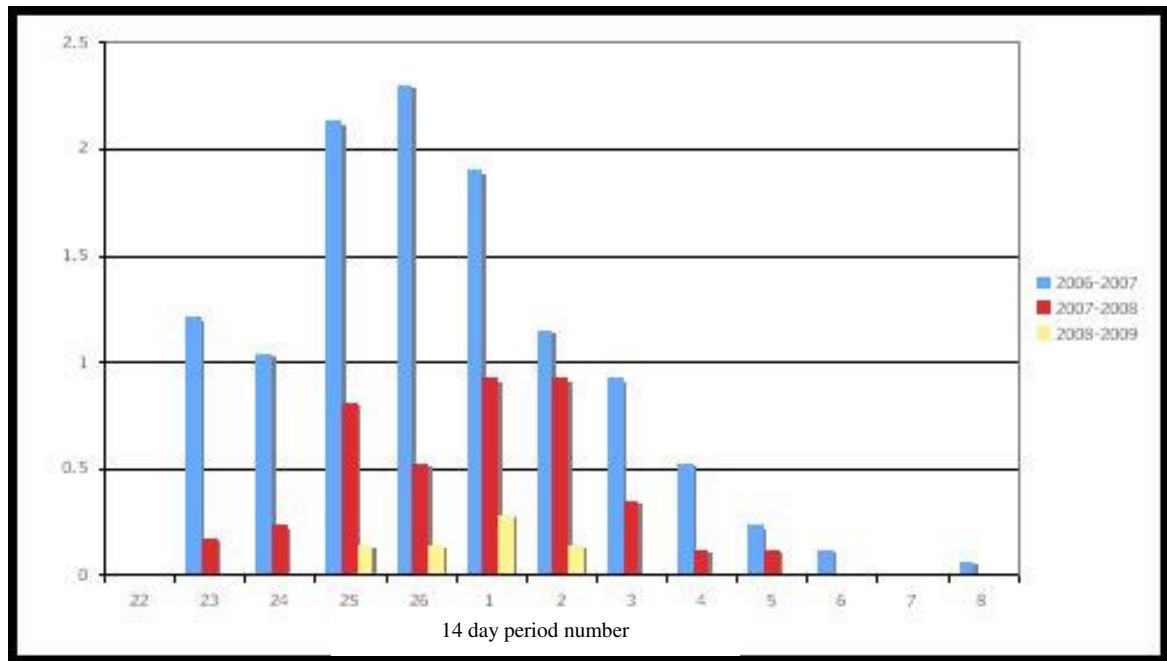


### *Leatherbacks: Nyafessa*

As Figure 3 shows, this same dramatic reduction in nesting leatherback numbers was observed in the southern camp of Nyafessa. Nest numbers were profoundly reduced from the previous 2 seasons, and the length of the nesting season was also much shorter.

The actual number of nests compared to those at Bame are much less, but this is the usual pattern for these two sites, and is of itself not a cause for alarm.

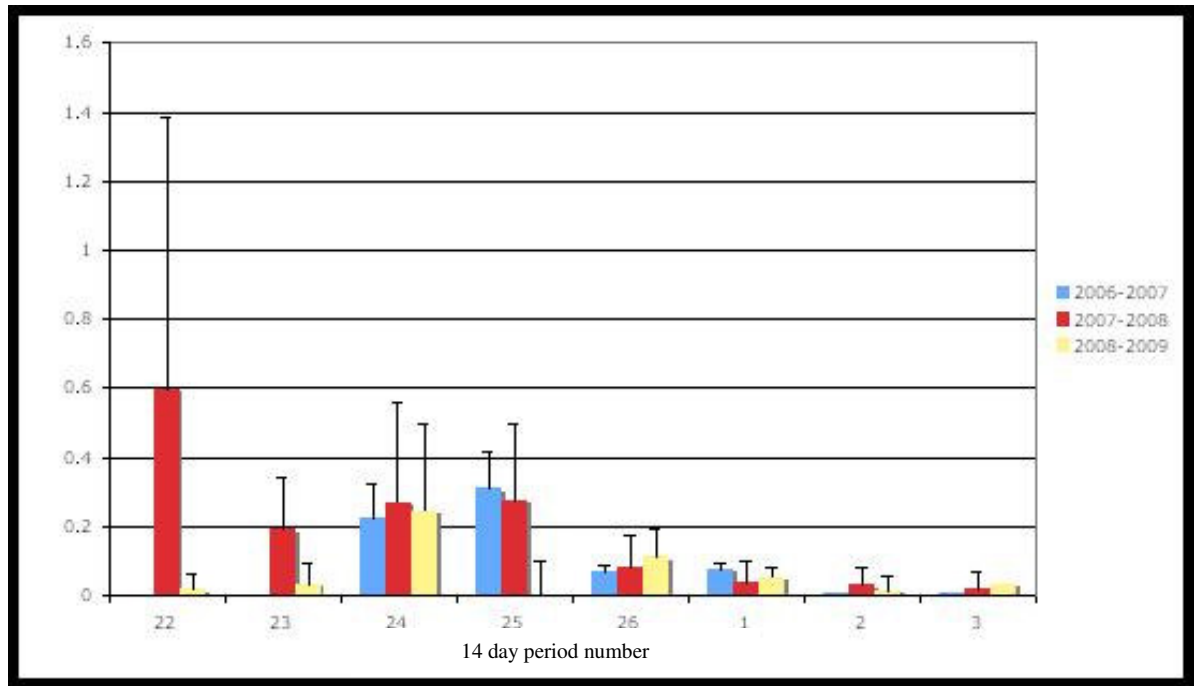
**Figure 3:** Comparison of median leatherback nest numbers for each 14 day period of the season at Nyafessa, over 3 years.



### *Olive Ridleys*

The extremely low numbers of olive ridley nests encountered during the season forces us to combine data from the Bame and Nyafessa sites in order to make comparisons with previous seasons. As Figure 4 shows, the difference in olive ridley nesting numbers was less extreme than for leatherbacks, and no statistically significant differences were observed between seasons.

**Figure 4:** Comparison of median olive ridley nest numbers for each 14 day period of the season (Bame and Nyafessa combined), over 3 years.



### *Additional Activities*

#### PILOT STUDY OF NEST SURVIVAL

Since the start of data collection at Mayumba (1998) teams have faithfully recorded the numbers of nesting sea turtles in distinct sectors of the beach. While these data permit us to evaluate long-term trends in nesting numbers, they do not necessarily translate directly into numbers of hatchlings reaching the sea. It is already well recognized that the survival rate of embryos is low, and that hatchlings face a barrage of threats including predation, and pollution. While it is impossible to gauge the level of predation and other losses to developing turtles once at sea, some measure of survival within the nest chamber environment can be taken through the study of evacuated nests.

During the 2008/09 nesting season, WCS, Mayumba National Park, and Spanish PhD student Maite Ikarán launched an initial pilot study into nest survival. As this work is destined for publication in Ms Ikarán's final PhD thesis, we are unable to report the results of the study in this report. However, the following pages describe the methodology employed.



The principal objectives of the study were:

- a) Develop a field methodology for nest survival study adapted to the conditions at Mayumba.
- b) Describe the reproductive biology of leatherbacks with regard to females, eggs, and hatchlings.
- c) Examine the physical parameters of egg incubation.
- d) Estimate incubation success under natural conditions at Mayumba.
- e) Identify the principal causes of mortality for embryos and hatchlings in the nesting beach environment.
- f) Train a local field team in the techniques needed for the long-term follow up of this study.

### *Methods*

The key element of this study was the reliable marking of leatherback nests at the time of nesting, such that their fate could be monitored during incubation, and the nest chamber examined after hatching. Temporary marking was done during nighttime patrols when a suitable nest under construction by a turtle was encountered. After laying, while the turtle is covering up the eggs, a small wooden plaque (Figure 5) with a unique identifying number is placed on the sand within the chamber once approximately 10cm of sand has covered the eggs. This marker is used to confirm the correct identification of the nest when the chamber is eventually excavated after hatching.

Figure 5: Nest chamber identification plaque



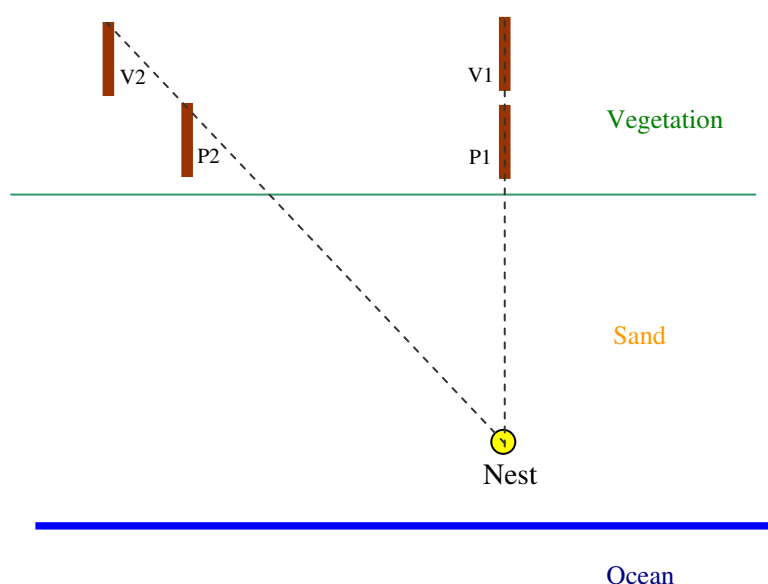
In 6 of the nests marked a small data logging thermometer was placed among the eggs during laying. None of these activities in any way disturbed the laying behavior of the turtles, who, once laying, appear insensible to the presence of researchers.

While the turtle is completing the coverage of her eggs, a small painted stick with a length of string attached is placed in the sand directly above the chamber. This marker enables the team to locate the

nest the following morning when a more reliable long-term system of marking is undertaken. During this time the GPS location of the nest and other pertinent biometric data are taken.

Long term marking (adequate for 70-75 days) is achieved by placing four wooden stakes in the dune vegetation beyond the nest (well away from any area liable to sea erosion). Pairs of stakes are lined up so that a cord draw between them and extending beyond bisects the exact location of the nest chamber. By using two pairs of stakes, the exact location of the chamber can be found (Figure 6).

Figure 6: Plan of the system of long-term marking



During the incubation period of 60 to 70 days, the marked nests are surveyed periodically for any traces of predation, flooding, erosion, or any other event liable to impact nest integrity and incubation. After 60 days, the nests are visited every day to check for hatching. In order to avoid disturbing nests not yet hatched, nests were only excavated once the tracks of the emergent hatchlings were seen, or after 75 days from laying.

Once these conditions are met, the study team begins to excavate the nest area by gently digging an area of roughly 4m<sup>2</sup> over the nest location. Once the marker plaque has been located, extreme caution is used so as to gently uncover the remains of the egg chamber (Figure 7 and 8).

Once the chamber has been located, the remains are removed to the surface and analysed in situ (Figure 9). Great care is taken during this process in order not to miss noting the presence of any small predators, such as insect larvae, that may be present in the chamber. Once on the surface remains are sorted into the following categories:

- Full-sized egg shells over 50% complete (evidence of a hatched turtle).
- Dead or exhausted hatchlings
- Non-developed eggs (much smaller than healthy full-term eggs). These are sorted into those with evidence of predation, and those whole.
- Full-sized but un-hatched eggs. Also sorted into predated and non-predated. These are carefully opened to note the presence of an embryo or not. The development stage of the dead embryo is also noted.

**Figure 7: Digging out the nest chamber**



**Figure 8: Chamber revealed**



**Figure 9:** The contents of a nest chamber after analysis



27 nests were marked during the Bame nesting season. Of these 23 were fully analysed. Two were lost due to erosion and a further two were not analysed as their hatching date fell after the departure of the team from the field.

The results of this important study are expected within the next 12 months, and will be published in the scientific literature, with the assistance of the Irish Government gratefully acknowledged.

#### *Fisheries and Oil Pollution Surveillance*

We were unable to provide boat patrols of the marine sector of the national park during the peak of the nesting period due to the unavoidable absence of the project's boat pilot. However, WCS teams did continue to provide fisheries surveillance from the shore. Information provided by these teams and our project radar installation in Mayumba facilitated 3 control missions by the local fisheries authorities that led to the seizure of 4 industrial fishing trawlers and the confiscation of their catch.



Meanwhile, the project has been busy in lobbying the Libreville Fisheries Department to take a harder line with illegal fishing vessels, and in particular, to use the recently installed VMS automated surveillance system as a pro-active means of curbing illegal fishing in the coastal zone. In addition, we have recently co-organized and hosted the second Mayumba Illegal Fishing Training, in which a specialist team of 5 trainers from the USA provided 11 days of intensive training in boat handling, search and rescue techniques, first aid, illegal fisheries mission planning and other pertinent topics. The audience for this dynamic training included staff from Mayumba National Park and Conkouati National Park in Congo, plus boat crews and mission planners from the Gabonese Navy, the Merchant Navy, and the Mayumba Fisheries Office.

**Figure 10:** A navigation class for illegal fishing patrol boat crews at Mayumba



In terms of oil pollution, all turtle teams were trained to provide early warning surveillance of incidents of oil washing ashore. However, unlike in previous nesting seasons, we are pleased to announce that no incidents of significant oil pollution were noted during the period.

### *Turtle excluder devices (TEDS)*

In our last report we outlined a proposed trial of turtle excluder devices on shrimp trawlers in Gabon as part of a WCS/NOAA initiative to reduce fisheries by-catch mortality of sea turtles in Gabonese waters. We are pleased to announce that these trials took place between the 11<sup>th</sup> and 21<sup>st</sup> of September 2008. Conducted by a NOAA fisheries observer aboard the shrimp trawler Amerger 8 of the company SIFRIGAB Inc, the test involved 35 consecutive trial trawls, during which the weight of shrimp catch and by-catch in the test nets was compared to the non-test nets used at the same time.

A 3% shrimp catch loss in nets equipped with TEDs was recorded over 30 test trawls with a top-shooter style TED. There was no significant difference in rates of catch overall between TED equipped nets and control nets, while bycatch was reduced in TED nets by 8%. Predictably, no sea turtles were caught in the TED equipped nets during the trial.

The ship's captain was very pleased with the trial period and the crew encountered no difficulties in using the equipment. On return to shore, the company's Director expressed his satisfaction with the trial and his hope that the entirety of the Gabonese shrimp fleet could be equipped with TEDs. A meeting followed at the Fisheries headquarters in Libreville at which WCS and NOAA announced the purchase of sufficient TEDs to equip all of SIFRIGAB's shrimp vessels with TEDs before the end of 2009. These are currently in the USA and will arrive in Gabon at the end of July. The fitting of these TEDs will have a dramatic effect on lowering offshore fisheries related bycatch mortality in Gabonese waters.

### *Satellite telemetry*

Once again during the 2008/09 nesting season, patrol staff assisted a visiting scientist from the University of Exeter's Turtle Research and Conservation group. This is the fourth year of this partnership with WCS, the Park, and ASF. Dr Matt Witt of Exeter University visited Mayumba in February and successfully attached 4 satellite beacons to nesting leatherbacks. The units employed this year are the smallest and least invasive yet used in the project, and have been sending back regular signals since their deployment.

In an allied effort, Sarah Maxwell, a US masters student deployed 13 satellite beacons on olive ridley sea turtles from Nyafessa camp in the south of the Park. This was the first attempt to track olive ridleys off the Gabonese coast, and has been providing very exciting

results, which will enable us to better tackle the coastal bycatch issue in southern Gabon and Congo. All results from both these programs are available on the seaturtle.org website: [http://www.seaturtle.org/tracking/?project\\_id=270&dyn=1218617802](http://www.seaturtle.org/tracking/?project_id=270&dyn=1218617802)

### *Conservation Education*

Communicating the wonder, value, and uniqueness of the Mayumba sea turtle population to local people has been a mainstay of our efforts to provide long-term protection to the nesting beaches. This year was no exception, and our conservation education project worked extremely hard in Mayumba schools and the small communities along the Banio Lagoon, opposite the nesting beach. In addition to our regular program of village visits, the Mayumba outreach project facilitated, coordinated, and assisted with the national ‘Turtle Day’ celebrations. This day, dedicated to sea turtles, was created by WCS and the Gabon Sea Turtle Partnership, and this year, involved 4 key sites. These were Cap Esterias ( the northern community where green and hawksbill turtles are traditionally hunted for food), Libreville, Gamba, and Mayumba. At each site our outreach team worked with local authorities to organize sporting, cultural, and educational events with local schools and the wider population (Figures 11, 12, and 13). These very popular events were reported over several days on national television, radio, and in the national press.

**Figure 11: Inter-school sports during the Cap Esterias ‘Turtle Day’**





**Figure 12:** A children's parade on Turtle Day in Mayumba



**Figure 13:** A turtle art exchange class using recycled materials. Artworks were exchanged with a school in the USA





## CONCLUSION

The 2008/09 nesting season saw dramatically reduced numbers of leatherback turtles visiting the beaches of Mayumba. This was the second year that such a major drop in numbers has been recorded. This trend has been confirmed from other field sites in Gabon and elsewhere on the Central African coast. By contrast, turtle presence on the Central and South American coast has been exceptionally high. While we can not assume that the turtles usually recorded at this time on Africa's coastline are on the other side of the Atlantic, these observations do suggest that the drop in numbers does not necessarily imply a dramatic drop in the population size. This underlies the importance of long-term monitoring in the study and conservation of sea turtles. With such long-lived and widely migrating species, at least a decade of data are required before population trends can begin to emerge. Despite the considerable investment in time and money that this entails, it is fundamental if we are to adequately equip ourselves with the baseline knowledge necessary to make sense of annual monitoring figures, and thus plan global conservation measures.

Meanwhile, the presence of our two principal field teams, supported through this partnership, has once again ensured that Africa's most important leatherback nesting beach was completely protected from human hunting and illegal egg collection. A low level of human presence was noted outside of the key nesting areas, but teams encountering illegal egg collectors confiscated sacks of eggs and warned the perpetrators of possible legal consequences should they persist in their activities.

Changing the cultural habits of generations is clearly a long-term process however, and this project, while ensuring complete protection for the beaches within Mayumba National Park, takes the view that education is a key element to long-term success. As such we once again put great effort and time into our outreach program, especially in support of the newly created National Turtle Day. This years events were widely reported in Gabon's media, and were extremely popular with the coastal communities in which they were held. By continuing this vital foundation building work, we hope that the task of protecting turtles in the future will be heavily assisted by local communities.

Although not supported directly by Irish Government funding, our additional activities, including the new nest survival study, the ongoing satellite telemetry study, the Turtle

Excluder Device project, and our work in combating illegal coastal fishing, are helping us to extend our protection of this vital population into the coastal zone. These efforts are as important as patrols on the beaches themselves, and go hand in hand with our overall vision to maintain the Gabon coast as the epicenter of the eastern Atlantic leatherback turtle population.

## ACKNOWLEDGMENTS

This work was made possible through the generous support of the Irish Government's National Parks and Wildlife Service. We are deeply indebted to them for supporting turtle protection activities at Mayumba. In particular we would like to thank Ferdia Marnell for his unfailing support in creating and sustaining this partnership.

WCS, ASF, and Mayumba National Park would also like to acknowledge the support of our other partners, namely USAID (CARPE), US Fish and Wildlife Service (MTCA), CAWHFI, Sea World Busch Gardens, and IdeaWild.

Finally we would like to thank the individual field staff who undertook most of the patrol and data collection work during the 2008/2009 season:

Junior Makanga  
Edgard Pemo  
Elie Ibouanga  
Richard Tchindongo  
Max Makosso  
Quevain Makaya  
Guy Makanga  
Alain-Brice Djimbi Mavoungou  
Souami Nzassi  
Pascal Makoundi Mboumba  
Stephanie Mahinou Makaya  
Claude Sitou  
Matthew Witt  
Sarah Maxwell

Special thanks go to Floriane Cardiec who supervised the turtle field season, analysed the data, and wrote a first draft of this report.