

FINAL REPORT

PROJECT  
STRENGTHENING THE CONSERVATION PROCESS OF NESTING SEA TURTLES IN TAYRONA  
NATIONAL PARK - COLOMBIAN CARIBBEAN  
SEASON 2007



PRESENTED BY:



SUPPORTED BY:



DECEMBER 05 2007

## **ABSTRACT**

The need for knowledge about the actual situation of marine turtles in protected areas in the Colombian Caribbean was the initiative to develop the project “Strengthening the conservation process of nesting sea turtles in Tayrona National Park – Colombian Caribbean”. During the months of March to August in a joint effort with the work executed by the Park Officers, daily and night surveys were carried out to intercept nesting females in the index beaches of the Arrecifes sector. Two nesting females were captured, measured and tagged, initiating the Tag and Recapture Program in this protected area. Furthermore, six nests of *Dermochelys coriacea* were exhumed obtaining a hatching success of 19.1% ( $\pm 22.0\%$ ; Range: 0.0% - 47.1%) and emergence success of 17.9% ( $\pm 20.0\%$ ; Range: 0.0% - 44.3); one more nest of *Eretmochelys imbricata* was exhumed with values of 61.3% in both, hatching and emergence success. Additionally, an assessment on the information gather during the last years was done identifying failure in the nest exhumation process. The conservation and management techniques used during the last years have been affected due to a lack of training, altering the quality of the results obtained in the area’s previous research projects. For this reason, the First Training Workshop in sea turtle conservation and management techniques was carried out by Colombia Marina’s principal researchers. Park Officers and Volunteers of this protected area acquired abilities to accomplish long-term night surveys and conservation of sea turtles in the Colombian Caribbean.

## **RESUMEN**

Ante la necesidad de conocer la situación de las tortugas marinas en áreas protegidas del Caribe Colombiano, se desarrollo durante los meses de Mayo a Agosto el proyecto de “Fortalecimiento del proceso de conservación de las tortugas anidantes en el Parque Nacional Natural Tayrona – Caribe Colombiano” en un esfuerzo conjunto con el trabajo adelantado por los funcionarios del Parque. Dentro de las actividades desarrolladas se realizaron monitoreos nocturnos para la interceptación de hembras anidantes en las playas índice del sector de Arrecifes, arrojando como resultado la interceptación, medición y marcaje de dos hembras anidantes, dando con esto inicio al programa de marcaje y recaptura para esta área protegida. De igual manera, se realizaron exhumaciones a seis nidos de *Dermochelys coriacea*, los cuales arrojaron un porcentaje de eclosión del 19.1% ( $\pm 22.0\%$ ; Rango: 0.0% - 47.1%) y de emergencia de 17.9% ( $\pm 20.0\%$ ; Rango: 0.0% - 44.3) y a uno de *Eretmochelys imbricata* con valores de 61.3 % para los dos éxitos mencionados. En el marco del proceso de valoración de la información, se identificaron fallas en la exhumación de los nidos y en las técnicas de manejo y conservación utilizadas debido a la falta de capacitación adecuada en el tema, lo que ha afectado la calidad de los resultados obtenidos en los años anteriores de investigación. Por esta razón se desarrolló el I Taller de capacitación en técnicas de manejo y conservación de tortugas marinas en el cual funcionarios y guardaparques voluntarios de esta área protegida, adquirieron habilidades para el monitoreo y la conservación a largo plazo de las tortugas marinas en el Caribe Colombiano.

## 1. INTRODUCTION

The actual need to protect sea turtles is a reality, their continue exploitation over the last 30 years has made that all species are listed in some of the categories of red books, not only in Colombia but an international level (Castaño-Mora 2002). In the Colombian Caribbean, the lack of knowledge in biological and ecological aspects of the nesting populations, as well as the small number of research projects carried out, the lack of methodology standardization and common goals has not permitted the establishment of a management plan that will put a stop to their eventual extinction.

Current management for sea turtle conservation in the Colombian Caribbean includes inappropriate or outmoded methodologies. Lack of enforcement of existing laws and regulations contributes to poor management. Additionally, the lack of coordination across an entire species' or population's geographic range may result in one country's management and conservation efforts inadvertently being negated by activities affecting the same species in another country or region. While many current efforts to conserve marine turtles will continue, their ultimate effectiveness in many cases will be hampered by non-performance of appropriate management, the performance of inappropriate management, and the probability that the beneficial effects of many marine turtle management efforts may be negated by inappropriate management in other parts of the species' or population's range.

In many parts of the world marine turtle conservation is hampered by few or no training opportunities, inadequate formal education, insufficient knowledge of or access to technology and its applications, and meagre institutional capacity. Failure to address the development of local institutions and training will perpetuate major gaps in our understanding of global marine turtle biology and conservation and prevent the local evolution of professional opportunities and institutions involved with marine turtle conservation.

Sea turtles are species highly migratory, they don't belong to any country but at the same time they belong to each of the countries that visit along they long journeys. These made the study of this animal difficult, being the best time to do so when the females arrive to nesting beaches during reproductive seasons (Shanker et al., 2003). The knowledge of the nesting population is the first step for the conservation of these species. Thus with a adequate perspective, clear objectives and an optimum development of the projects it is possible to obtain the fundamental information, so better actions can be follow (Richardson, 1999).

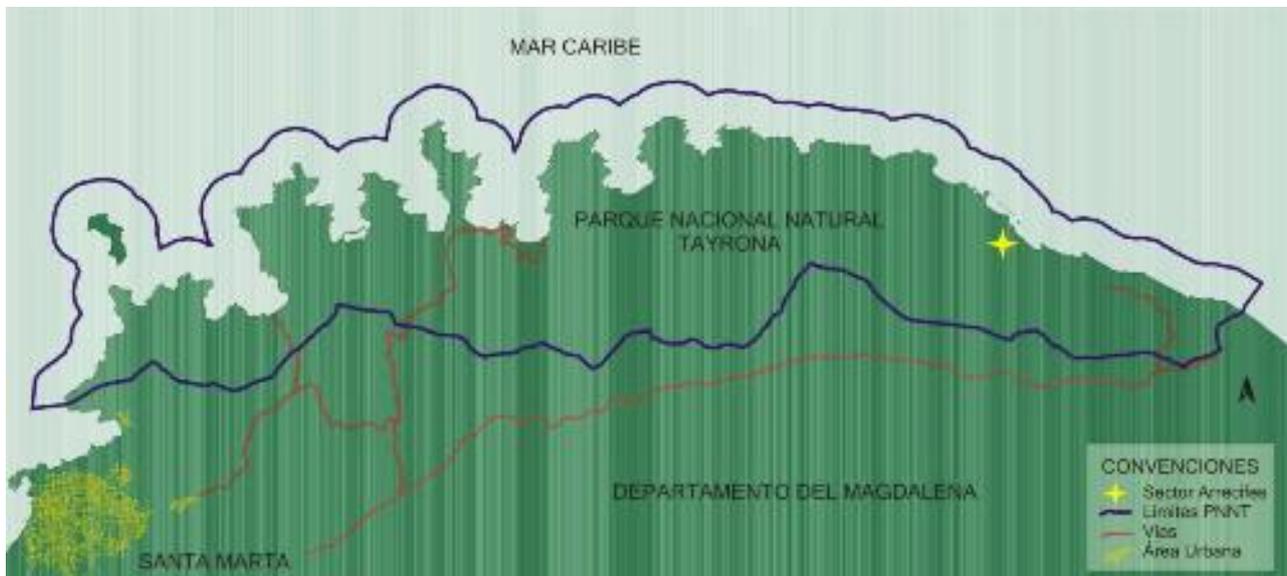
Priorities for research are adjusted to processes in every country, and in Colombia are necessary to optimize the status of the knowledge of these individuals, so the conservation efforts that take place will achieve their objectives and not the opposite. For that reasons, the actual management and conservation techniques have to be adapted to every need, following projects circumstances (Eckert, 1999).

Research conducted within the study area has been done randomly, sporadically, using non standardized methodologies and without proper training. Although results shown the presence of four of these threatened species (Medem 1962; Kaufmann, 1973; Pinzón and Saldaña, 1999; Marrugo and Vásquez, 2001, Gutiérrez and Merizalde, 2001; Rincon, et al. 2001; Sánchez, 2002; Moreno, 2002; De Luque et al., 2003; Ospina and De Luque, 2005; Moreno-Munar, 2006; Borrero, 2007; Escobar, 2007), understanding critical aspects regarding their biology, habitat use, nesting ecology, migratory patterns and contemporary conservation issues are critical priorities for the

development of an action plan. The aim of this plan is to safeguard sea turtle populations from a continuing decline into eventual extinction not only in Colombia, but also across the entire region. Action needs to take place urgently to save sea turtles from extinction in protected areas of the Colombian Caribbean. A better understanding of population trends through systematic beach surveys will provide valuable information for the conservation of nesting threatened species of sea turtles at Tayrona National Natural Park. Therefore, it is necessary to keep the process of gathering biological information in a constant way, with strategies of institutional collaboration, combining research on their reproductive biology with an update on their current conservation status, meanwhile building capacity among local and regional stakeholders for conservation management of sea turtles in the Colombian Caribbean. Conservation issues affecting sea turtles in the Colombian Caribbean are: lack of trustworthy and scientific information, poor training in research and conservation management techniques, non existence knowledge of the real status of their populations, low levels of awareness inside local communities and deficient data of the threats that sea turtles have to overcome.

## 2. STUDY AREA

Surveys will be conducted at nesting beaches at Tayrona National Natural Park (TNNP) (11° 16' - 11° 22' N, 73° 53' - 74° 12' W) in the Colombian Caribbean (Figure 1). The study site was declared a National Natural Park in 1964 in order to the conservation management of species from terrestrial ecosystems, mainly rain forest (12692 Ha) and marine ecosystems of coral reefs and sea grass pastures (6564 Ha) (MAVDT, 2006).



**Figure 1.** Localization map of the study area - Tayrona National Park (TNNP).

The characteristics of the three most important beaches in the Arrecifes sector are described as follow, using the criteria develop by INVEMAR (2002) (Figure 2).

- San Felipe: Short beach (170 m. long) with high energy. The middle zone is 5 m width with moderate slope (Figure 2.a).
- La Gumarra: High energy beach of 830 m. long with moderate slope. Its middle zone is 10 - 15 m. width. Its higher zone is wider with 150 m. in average (Figure 2.b & c).
- Arrecifes: Beach with the highest visitor used with 1164 m. long, with abundant solid residues. Also, it has two small lagoons (Figure 2.d). In the same way, it present eco-tourism infrastructure to supply with the demand of visitors that arrive to the Park (Figure 2.e & f).



**Figure 2.** Index beaches in the Arrecifes sector – PNNT. a. San Felipe. b and c. La Gumarra. d. Arrecifes. e and f. Eco-tourism infrastructure in Arrecifes beach.

### 3. METHODS

To establish the research protocols needed to standardized methodologies, surveys of the nesting biology of sea turtles in the Arrecifes sector – TNNP were carried out during the 2007 season. The main objective was to acquire the information of the nesting females in the sector, to obtain scientific bases to make decisions in the recuperation and management of their populations. So, a continuation we described the method used during the development of the project “Strengthening the conservation process of nesting females in Tayrona National Park – Colombian Caribbean”.

#### 3.1. Monitoring nesting activities

Beach surveys were performed daily, between 19:00 to 04:00 hours, in the index beaches of the Arrecifes sector during the nesting season (June 2007 – September 2007); they consisted in night assessments along the target beaches aiming to intercept any nesting female or tracks. Also some early morning surveys were develop, in case of not noticed any trace or individual during the night before. Beach surveying methods from Schroeder & Murphy (1999) were used for identification of nesting vs. non-nesting emergences; and identification of species specific crawl signs (Figure 3).



**Figure 3.** Activities carried out during the nesting surveys in TNNP. a. Measuring the width of a nesting loggerhead turtle. b. Localization and translocation of a threatened nest.

#### 3.2. Tagging of sea turtles

Historically, the tagging of sea turtles is one of the most important activities in the knowledge of their conservation needs (Balazs, 1999). Despite this, the studies carried out in TNNP not included this in any of their objectives. For this reason was initiated the tag and recapture program in TNNP giving the guidelines and recommendations needed to their development. Each encountered nesting female of the Chelonidae family, as the loggerhead (*Caretta caretta*) and the hawksbill (*Eretmochelys imbricata*) were tagged in the proximal scale of their front flippers following the protocols described by Balazs (1999), this was done using steel Monel 861s tags (National Band Tag Co.). The tagging of the sea turtles was established to identify individuals, migratory routes and to estimate the nesting population size (Figure 4. a & b).

a.



b.



**Figure 4.** Nesting females of the Cheloniidae family tagged in the tag and recapture program in TNNP. a. *Caretta caretta*. b. *Eretmochelys imbricata*.

### 3.3. Biometric data

Bolten (1999), says that the measurement of sea turtles are carried out to establish the relationship between size and the quantity of eggs (reproductive potential); to know the minimal size in which the turtles are nesting in TNNP (minimal size of sexual maturity) and, to follow up the size of the nesting females to evaluate the population condition. Morphometric parameters included minimum curved carapace length (CCL) and widths (CCW) (Bolten, 1999) were collected when the females intercepted were returning to the sea. Data collected from measured, weighed, and tagged turtles was recorded daily in a computerized turtle data base.

### 3.4. Relocation of nests, incubation follow ups and hatchlings success evaluation

Endanger nests were relocated to avoid egg loss caused by poaching and inundation. These nests were transferred between one and six hours after being laid (Mortimer, 1999). Manipulation and transportation of eggs was done in plastic containers. All nests found during the reproductive season were monitored until hatching (Figure 5).

a.



b.



c.



d.



**Figure 5.** Procedure of nest relocation of hawksbill sea turtle (*Eretmochelys imbricata*) founded in inundation risk. a. Park Officer locating the nest b. Procedure of egg marking. c. Researcher moving the eggs to a Styrofoam box. d. Locating the eggs in the Styrofoam box.

Nest were delimited using plastic nets around them buried in the sand, in order to protect the hatchlings from eventual predators and to take some data such as: initial and final day of hatching, number of alive and dead hatchlings. Additionally, nests were exhumed after hatch, and the contents of every nest were categorized to determine the hatchling and emergence success (Figure 6).

a.



b.



c.



d.



#### 4. RESULTS AND DISCUSSION

The sea turtle conservation process in TNNP is not new. It has been executed since 1999 but the results of these years of research were confused and in many ways the information that should exist, doesn't. This situation joint to the new interest of the National Park Trustees of improve the strategy was the principal reason for this proposal. The objectives looked for begin to fill the information gaps in the basic knowledge about this animals in this important area for the country. According with the little information available, the nesting season used to begin the first days of May and goes until the last days of August, sometimes including the beginning of September. The Colombia Marina's researchers began their job in the first days of June due to logistical aspects, but the park staff did it the first of March, so the complete season was monitored.

The park staff monitored daily in the morning because of their job during the day, so until the Colombia Marina staff began work the night monitoring was not possible, making the tagging and measuring proceeds impossible, nevertheless this enabled us to have the complete information about nesting activity in Arrecifes Sector during 2007. It was possible to determine the relation between nest and crawl by beach and specie, showing that although the beaches characteristics are appropriate for the three species that use to nest here (*Dermochelys coriacea*, *Caretta caretta* and *Eretmochelys imbricata*), the growing tourist use of this sector could be affecting the successful nesting process of the different species (Table 1 and 2).

**Table 1.** Values of the nesting effectiveness in the Arrecifes sector and in each of the index beaches during 2006 and 2007 season.

Season	Sector	Arrecifes	La Gumarra	San Felipe
2006	46.7%	37.5%	58.3%	50.0%
2007	30.4%	36.4%	37.5%	0.0%

**Table 2.** Values of the nesting effectiveness of the species nesting in the Arrecifes sector during 2006 and 2007 season.

Season	<i>D. coriacea</i>	<i>C. caretta</i>	<i>E. imbricata</i>
2006	90.0%	22.2%	27.3%
2007	42.9%	0.0%	25.0%

Since Colombia Marina began to work in the first days of June, just four females arrive to the sector, and two of them were tagged and measured (Table 3), beginning the Sea Turtle Tagging Program in TNNP. This tool is one of the most valuable in the conservation of sea turtles and inside the area, they have never tagged a turtle missing important information, so this was a significant achievement for our goal of protect these animals.

**Table 3.** Registry of the tags applied and the measures taken to two nesting female sin TNNP.

Arriving Code	Specie	Left Tag	Right Tag	CCL (cm.)	CCW (cm.)
2006	<i>C. Caretta</i>	YYC 901	YYC 902	99.5	85.0
2007	<i>E. imbricata</i>	YYC 954	YYC 956	86.0	78.0

One of the major concerns of Colombia Marina was the little theory and practical knowledge that the park staff had in Conservation Techniques and this was confirmed with the results obtained from the nests relocation done in the beginning of the nesting season, monitored only by park staff. The relocation proceeds had important failures evident during the exhumation process and study of cases done by Colombia Marina in the First Work Shop in Conservation and Management Techniques for park staff and volunteers in TNNP.

After the workshop, the next relocation process was done between Park staff and Colombia Marina staff, applying the knowledge acquired; obtaining great results in the incubation process of one nest of *E. imbricata* that was moved from one beach to another (ARFND07003). In the next tables (Table 4 and 5) you can observe the results of the exhumation process, showing the differences among the ones in situ (GMRND07002, GMRND07003, GMRND07004), ex situ (ARFND07001, ARFND07002, GMRND07001) and ex situ after workshop ARFND07003.

**Table 4.** Hatchling Success and Emergency Success determined to the monitored nest during the 2007 season in the Arrecifes sector – TNNP:

Nesting Code	Specie	Hatchling Success	Emergency Success
ARFND07001	<i>D. coriacea</i>	0.0%	0.0%
ARFND07002	<i>D. coriacea</i>	0.0%	0.0%
ARFND07003	<i>E. imbricata</i>	61.3%	61.3%
GMRND07001	<i>D. coriacea</i>	0.0%	0.0%
GMRND07002	<i>D. coriacea</i>	47.1%	44.3%
GMRND07003	<i>D. coriacea</i>	26.2%	23.0%
GMRND07004	<i>D. coriacea</i>	41.4%	40.0%

**Table 5.** Average hatchling success for the nests of *Dermochelys coriacea* exhumed in the Arrecifes sector having into consideration the management action used.

Management Action / Statistical Data	ex situ (n=3)	in situ (n=3)
Average	0.0%	38.3%
Standard Deviation	-	10.8%
Range	-	26.2% - 47.1%

As said before, after identify the necessities in the management and critical points in the techniques used during these past years of work, it was clear the great necessity for knowledge in these subjects. So, Colombia Marina Foundation conducted the First Workshop in Conservation and Management Techniques for sea turtles, clarifying a lot of points and doubts that the park staff had. After the workshop, their field job improves and the lasts nest relocations were successful, obtaining better clutch and emergency success.

Other important point in this project, was to promote conservation of endangered species and their habitats through public awareness campaigns and educational activities, and even though the park has a great flow of tourist along the year, it was not easy to make conservation talks with a lot of people, so, the research team began to talk with people during the night when they were on the beach, sharing with them our goals and how they could help us to protect these animals with their behaviour on the beach. People were really receptive and they help us to tell more people about the project. The flyers were useful, and cause interest in a lot of people making easy the awareness campaign.

And finally during the three months of monitoring the team was able to identify the potential threats for sea turtle in TNNP. We had the possibility of talk with the actors and now we know what it is necessary for improve the conditions of the beach and get the cooperation of the residents in the nesting beaches.

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**ANNEX**

**Annex 1.** Brochures used during the conservation activities involving visitors in Tayrona National Park.

**STRENGTHENING THE  
CONSERVATION PROCESS  
OF THE NESTING SEA TURTLES**



*Dermochelys coriacea* (Leatherback)  
Critically endangered



*Chelonia mydas* (Green)  
Endangered



*Caretta caretta* (Hawksbill)  
Endangered



*Friemelichelys imbricata* (Blackbill)  
Critically endangered

Of the six species of sea turtles found in the Atlantic Ocean, four of them nest on the beaches of the Tayrona National Natural Park.








**TAYRONA NATIONAL NATURAL PARK  
COLOMBIAN CARIBBEAN**

Photos courtesy of the Tayrona Tourism Office

**IF YOU LIVE ON THE COAST, OR VISIT A  
SEA TURTLE NESTING BEACH ON  
VACATION, YOU CAN HELP TO  
PROTECT THEM BY FOLLOWING  
THE NEXT RECOMMENDATIONS**

-  When you walk on the beach at night, try to minimize the use of flashlights.
-  If you encounter a turtle on the beach at night, remain quiet, still and at a distance, because human presence may discourage nesting.
-  For your safety, stay away of the nesting females; you may injure the turtle or cause her to leave without finishing nesting.
-  Remove recreational equipment from the beach at night. These items can deter nesting attempts and prevent the hatching from reaching the ocean.
-  Don't handle eggs or put any foreign objects in to the nest. You could introduce bacteria into the nest or injure the eggs.
-  Don't make beach campfires during nesting season. Sea turtle hatchlings are attracted to the light and may crawl in to fires and die.
-  Don't disturb traces left by turtles. Researchers use them to identify the species of turtle that nested and to locate, find and mark the nest to protect them.
-  Properly dispose of your garbage. Turtles may mistake plastic bags, styrofoam and trash floating in the water as food and die when this trash blocks their intestines.
-  If you have any question or you want to participate of the conservation activities taking place in the area, please contact the person in charge.

For further information about sea turtles please contact:  
[colombiamarina@tynbo.co](mailto:colombiamarina@tynbo.co)  
[tayrona@parquesnacionales.gov.co](mailto:tayrona@parquesnacionales.gov.co)