

# VOLUNTEER MANUAL

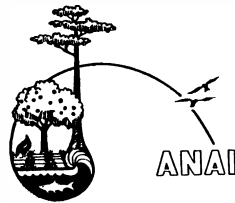
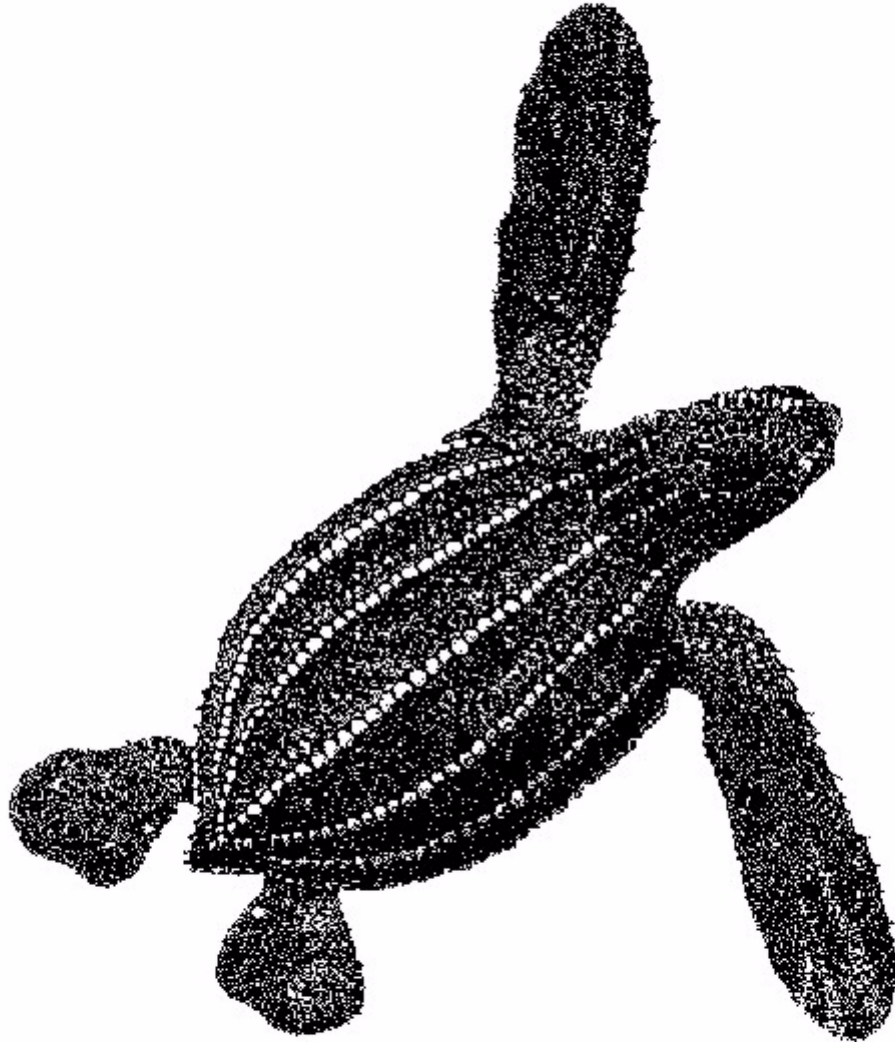
SEA TURTLE CONSERVATION PROGRAM  
SOUTHERN CARIBBEAN COAST  
COSTA RICA



2006

**VOLUNTEER MANUAL**

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SOUTH CARIBBEAN COAST  
COSTA RICA**



**ASOCIACIÓN ANAI  
TALAMANCA, COSTA RICA**



# INTRODUCTION



## Asociación ANAI

**ANAI** is a non-Government and non-profit organization, which has been working for the conservation and sustainable development of the Talamanca Region of Costa Rica since 1978. This region represents around 5% of the national territory and is one of the biologically richest areas of the planet with over 2% of the entire world's biodiversity. With Costa Rica's largest Native Indian population, English speaking Afro-Caribbeans, and campesinos, its cultural heritage is equally rich.

Incorporated under the Costa Rican law since 1983, Asociación ANAI is an independent organization with its own board of Directors. ANAI's formal membership includes a dozen scientists, local farmers and other professionals, both Costa Rican and US Americans. ANAI has put into practice a strategy that links conservation and sustainable development through activities that directly benefit both the people and the environment. The focus has been on establishing the conditions for a self-sustaining process involving work in the broad areas of conservation, economic development, training and education, organization and advocacy.

## Cahuita/Playa Negra Project History

The Cahuita- Playa Negra project was established by ANAI in the year 2000, after preliminary beach surveys indicated that this area was an important nesting site for the endangered Leatherback (*Dermochelys coriacea*) and Hawksbill sea turtles (*Eretmochelys imbricata*). The Project follows the model used in the other sea turtle conservation Project in Gandoca, in the Gandoca-Manzanillo National Wildlife Refuge, established over 15 years ago. As in Gandoca, until recently the sea turtle nesting activity at Cahuita and Playa Negra remained unknown to the outside world, and harvesting of eggs was actively carried out by the local population. Although in the past this practice was most likely sustainable as it was mainly for local consumption, and therefore the impact over the population was not significant. However with the improved road system to the area, and the increasing population numbers of the towns of Puerto Viejo and Cahuita, the poaching of turtle eggs, the increasing coastal development, pollution and beach erosion have become a serious threat to the sea turtles of the region. Although the project is new, and so is the data taken from it, it is estimated that, as same as in Gandoca, in the early 80's over 99% of turtle eggs were taken annually from the nesting beaches of Cahuita and Playa Negra. Although the taking of eggs has no immediate effect on the number of turtles nesting, the population could collapse in 20-50 years when no new females come to nest. At the moment, the projects of Cahuita-Playa Negra and Gandoca are helping to slow down that tendency, and help re-establish a viable population of sea turtles. Project staff patrols the beach, with assistance from volunteers, keeping poachers away from the nesting turtles and collecting research information and helping newborn hatchlings reach the sea.

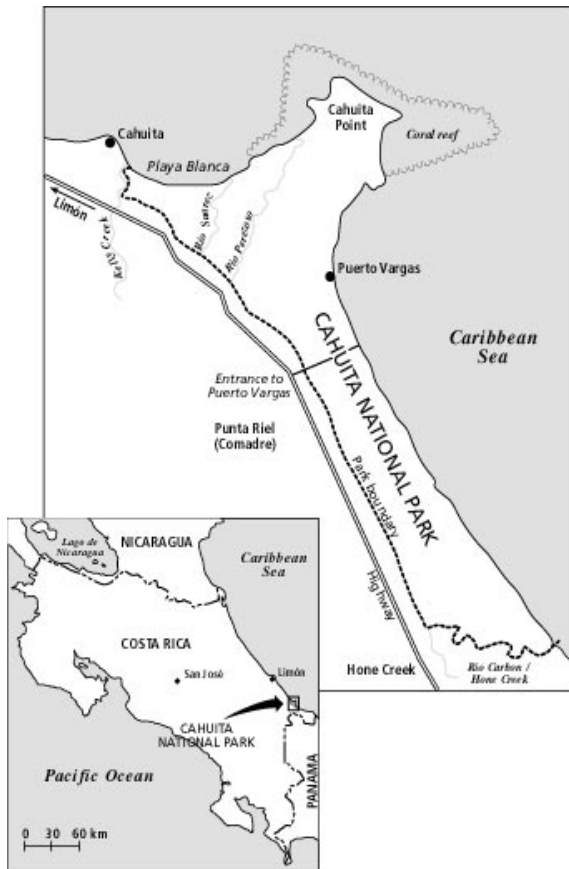
For the Conservation Project the sea turtles always come first, which may mean long hours and dirty, uncomfortable work. When you encounter your first turtle nesting on the beach we are sure that you will understand our philosophy of "Turtles First".

The Cahuita-Playa Negra project is small in size in terms of numbers of volunteers. The Volunteer Program works with a team size of about 10 volunteers at a time in Playa Negra while in Cahuita the number of volunteers is slightly larger. Without the volunteer program it would have been impossible

to carry out our work to protect the sea turtles. So right from the start, THANK YOU for your part in helping to protect the sea turtles of Cahuita and Playa Negra.

The area we work extends from Cahuita National Park down to Playa Negra, which ends on the town of Puerto Viejo de Limon, in a total of 8.1km. It is a very diverse place, both in terms of fauna and flora, and culturally. Three species of turtles nest in our beach, these are the Leatherback turtle (*Dermochelys coriacea*), which comes in larger numbers, Hawksbill turtle (*Eretmochelys imbricata*) and to a lesser extent the Green turtle (*Chelonia mydas*).

## **Geographical location of Cahuita- Playa Negra Project**



**Cahuita** - Is a village located about 43km south-east of Limon by road, and it has approximately 3500 inhabitants and it is known for the attractive beaches nearby, many of which are in the Cahuita National Park, which adjoins the village to the south. Most people are of Jamaican descent and colonized the Costa Rican coast in the middle of the 19<sup>th</sup> century. They used to subsist mainly by small-scale farming and fishing, but tourism is becoming an increasingly important part of their economy.

**Cahuita National Park** -This is a small park of 1067 hectares and it is about 7 km along the coast. It is one of the most visited parks in the country, for its white sand beaches, coral reefs, well maintained trail, and the nearby coral reef. Various animals are often seen, including coatis, raccoons, howler monkeys, white faced capuchins, ibises and kingfishers. Part of the sea turtle project is taken place on the park.

**Puerto Viejo** - Over the past few years Puerto Viejo became the most important travel destination on the Caribbean coast of Costa Rica. The village is 18km south-east of Cahuita by road, but it can also be reached from Cahuita by walking along the beach. The mixture of black and indigenous culture is very interesting, and Puerto

Viejo is the starting point to visit the nearby indigenous reserve of BriBri and explore its natural beauty.

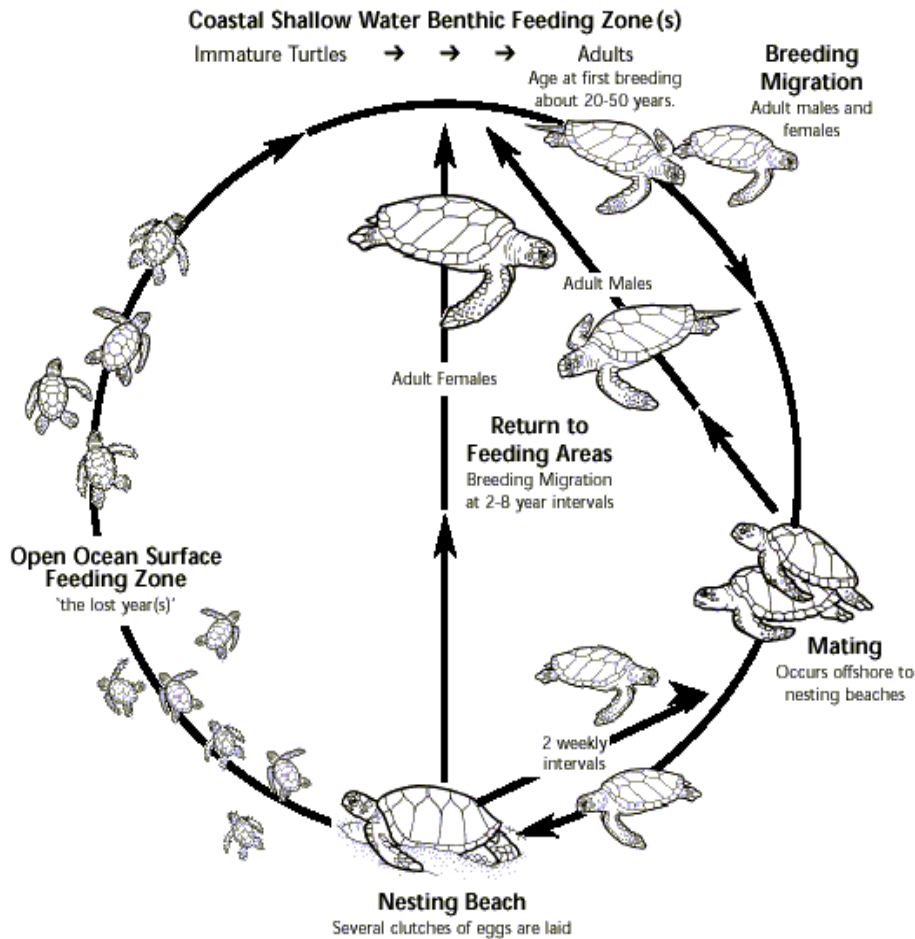
**Playa Negra** - The project is in charge of monitoring this beach with extends from Puerto Viejo village to the southern limit of Cahuita National park. It is an extension of the park, although it is considered public beach. It is easily recognized by its dark, black sand, and rolling waves. It is limited by the River Hone Creek at the border with the park, where you find an abundant aquatic bird life. The beach is a high-energy beach with a medium to steep slope. The waves here can be quite big and the current strong, it is not a good location for swimming. Due to long shore currents, strong waves and high spring tides, the berm is poorly developed and the shape of the beach is constantly changing throughout the season. The beach is also partly covered by assorted debris, especially logs washed down the Hone Creek River.

# Sea Turtles at Cahuita National Park

Turtles hear well especially lower frequencies and have a well-developed sense of smell. While their sensory acuity is reduced while on land, care should still be taken when approaching a nesting turtle. On land, turtles tend to be nearsighted.

Once the turtle lays her eggs she returns to the sea, never returning to the nest or eggs that she has just laid. Even before the eggs hatch they face many dangers. Eggs can fail to hatch due to heavy rain or seawater flooding the nest. High tides can wash away the beach and destroy whole nests, or ants, crabs, coatis, raccoons, dogs and pigs can hunt out nests as a source of food. Even a natural nest in perfect conditions will only have a hatch rate of about 60%.

The temperature of the eggs in a nest should be about 29.5°C. At this temperature the nest will produce a 50/50 mix of males and females. Higher nest temperatures produce more females and lower temperatures more males. After between 50-78 days the baby turtles hatch from their eggs and are ready to begin their struggle for survival.



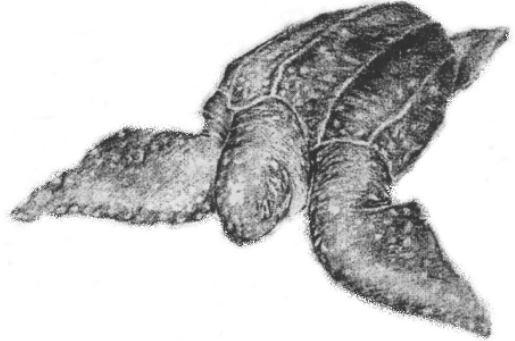
Hatchlings emerge from the nest, in groups, over a two or three day period. They normally emerge at night in response to cooling surface temperatures. Sometimes, however, they can emerge after a daytime rainstorm when the rain cools the surface of the sand. Once on the surface the hatchlings are attracted to light causing them to move towards the brightest and most open horizon: the sea!

Once on the surface the young turtles fall prey to many of the same predators that raided the nests for eggs. Even when the turtles reach the water many sharks and other large fish will be waiting to feed on them.

Once in the water the hatchlings will swim continuously until they reach the relative safety of the open water.

## THE LEATHERBACK SEA TURTLE:

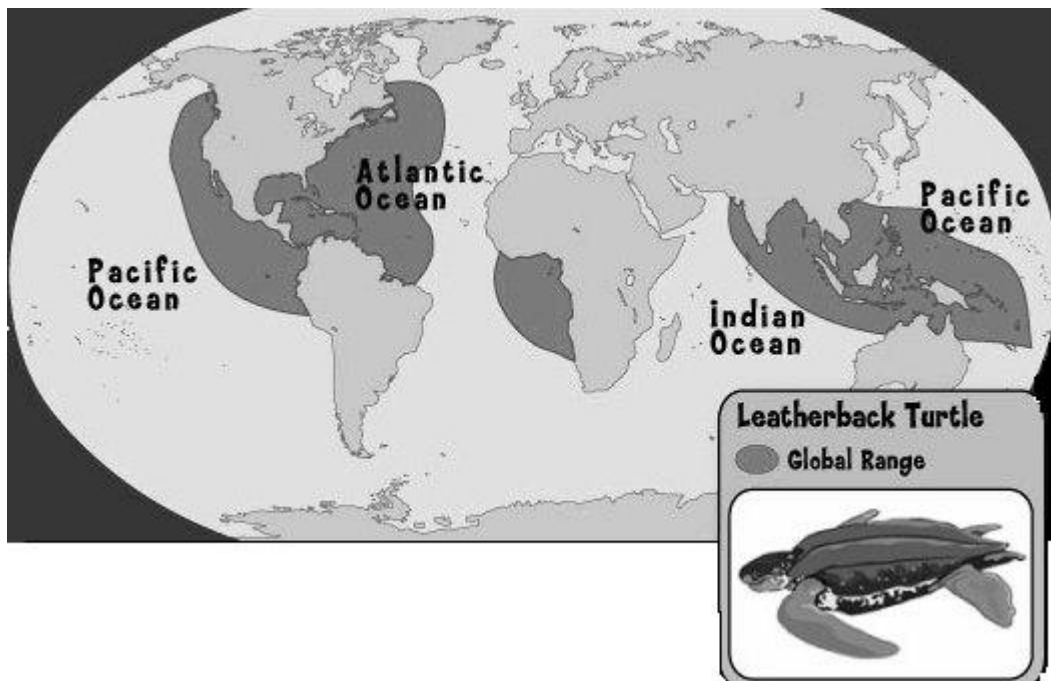
The Leatherback turtle is listed as an endangered species and is included in Appendix I of CITES and in the Red Data Book of the IUCN. The turtle population is in decline due to the hunting of turtles in some parts of the world for their meat and oil, the over harvesting of eggs, the accidental capture of turtles in commercial fishing nets, and the over-development of nesting sites.



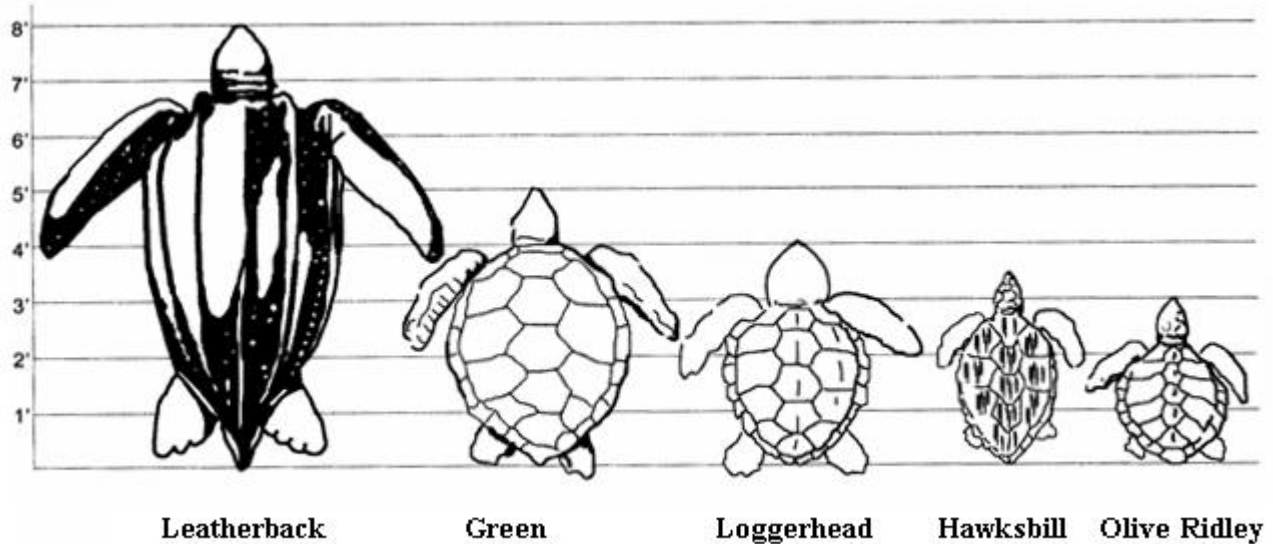
The monitoring of the nesting activity of this species run from beginning of March through to the end of July each year. The peak nesting period for the turtles is April/May with the first hatchling turtles emerging from mid May through to the end of the season.

Estimates of the number of leatherback turtles worldwide range from 26,000 to 43,000. It is believed that if the current rate of decline continues the Leatherback will be extinct within 18 years. One example of the rate of decline is the nesting beach at Terengganu in Malaysia: In 1970 the population numbered 6,000 females, 1980 = 1,500 females, 1990 = 25 females and in 1992 only 2 female Leatherback turtles were recorded for the whole of that year.

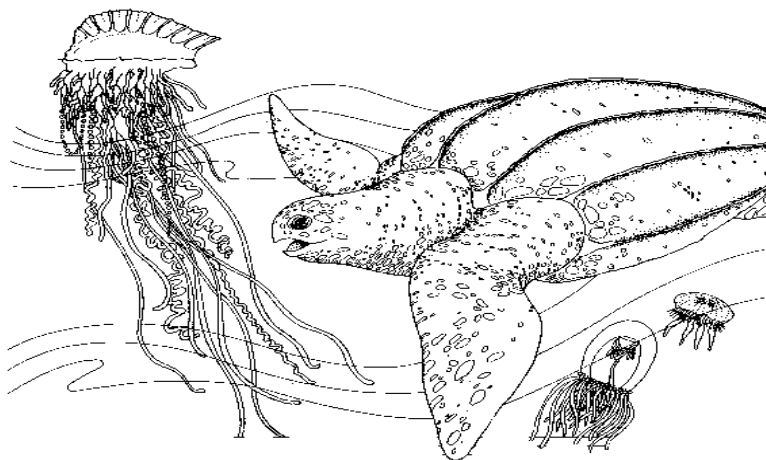
The Leatherback is the most widely distributed of all sea turtles ranging through all the oceans from the sub-Arctic to the southern extremes of all the continents (See map). The species can travel over 5,900 km (3,600 miles) in its search for food, but despite traveling these large distances the females will always return to the same areas to nest.



The Leatherback is also the largest of all sea turtles growing to a length of 2.5 meters (8 feet) and weighing between 300-600 kilograms (700-1300 pounds). The largest recorded turtle was a male of over 3 meters (10 feet) in length and weighing 916kg (over 2,000lbs).



Leatherbacks have been recorded diving to incredible depths with dives of up to 1000 meters (3300 feet) lasting 35 minutes, although dives normally only average 15 minutes. Research shows that dives by Leatherbacks correspond with the depth of their main food source, Jellyfish. The Leatherback eats all types of Jellyfish including the infamous Portuguese Man o War.



The lining of its mouth and throat contain backward facing spines that stop the slippery jellyfish from escaping. Many Leatherback turtles die from eating plastic products that look similar to jellyfish in the water.

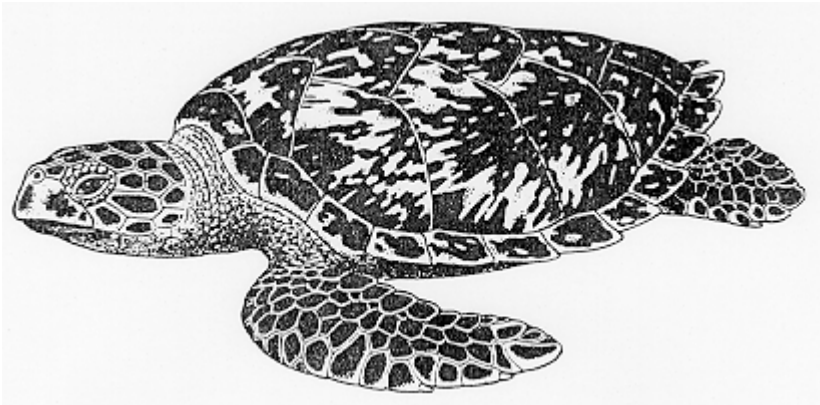
Each time the turtle eats a jellyfish it swallows seawater, in order to get rid of harmful excess salt from its body, the turtle continually "sheds tears".

The female Leatherback turtle will reach sexual maturity when they are about 10 years old. She will then return to the nesting areas where she was born to lay her eggs. Very little is known about the early life of the Leatherback turtle or how they find their way back to the original nesting beach.

It is known that the average female will reproduce every two or three years and that during a season she will nest, on average, about five times. The eggs that the turtles lay are both fertile and infertile. The fertile eggs are the biggest and on average about 80-90 of these eggs are laid, while the remaining infertile eggs, which are much smaller and will be about 30 are laid last. The average nest size for Gandoca project is 114 eggs with 84 fertile and 30 infertile eggs.

## **THE HAWKSBILL SEA TURTLE (ERETMOCHELYS IMBRICATA)**

The Hawksbill turtle is listed as a critically endangered species and is included in Appendix 1 of CITES and in the Red Data Book of the IUCN. The turtle population is in decline due to the hunting of turtles in some parts of the world due to the harvesting of eggs, meat, internal organs, accidental capture of turtles in commercial fishing nets and the over-development of nesting sites. The Hawksbill is especially vulnerable for exploitation by man as the shell, or carapace makes excellent highly polished jewellery such as rings, bracelets and hair clips (sometimes know as tortoiseshell).



Worldwide population is estimated to be between 8,000 to 15,000 nesting females. Hawksbill sea turtles are found extensively all over the world including the Atlantic, Pacific and Indian oceans, the Persian Gulf, and the Red and Mediterranean seas. In the western Atlantic, they can be found from Cape Cod, Massachusetts south to northern Brazil. Nesting occurs on isolated beaches in the Gulf of Mexico and the Caribbean Sea.

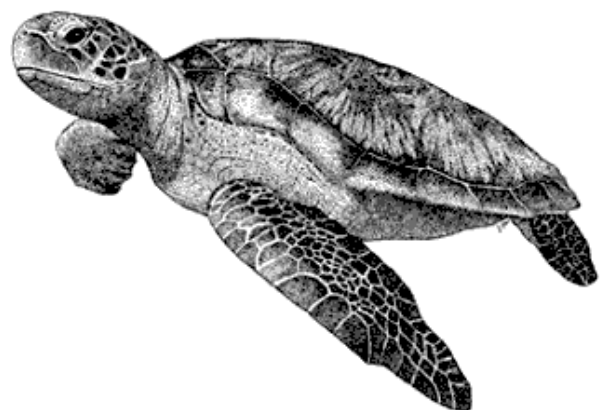
It is one of the smallest species, a medium-sized sea turtle weighing 40 – 60kgs (100 - 150 pounds) and growing to a carapace length of around 1m (3 feet).

One of the most obvious features is the animal's narrow, sharp beak used for foraging among coral crevices. This carnivorous turtle has a highly variable diet consisting mostly of sponges, jellyfish, and invertebrates such as crustaceans, sea urchins and mollusks.

The nesting females like to nest on the berm or vegetation section of beaches adjoining headlands and rocky areas. Unlike the leatherback, hawksbills can cross reefs and rocks to nest, but will also lay on open, sandy beaches. Females nest every two to three years but can lay up to 6 times in a season at an average of 15 - 21 day intervals; the age at sexual maturity for females is unknown and dependant on reaching a certain weight. It can lay up to 200 or more eggs (the average being about 130). Nest depth is around 40cms (15 inches).

## **THE GREEN SEA TURTLE (CHELONIA MYDAS):**

The Green sea turtle is listed as a threatened species and is included in Appendix 1 of CITES and in the Red Data Book of the IUCN. The turtle population is in decline due to the hunting of turtles in some parts of the world for their meat and oil, harvesting of eggs, accidental capture of turtles in commercial fishing nets and the over-development of nesting sites.



The green turtle can be found throughout the world in all tropical and sub-tropical oceans. In the U.S.,



Atlantic green turtles can be found around the U.S. Virgin Islands, Puerto Rico, and continental U.S. from Texas to Massachusetts. The population estimate of nesting females is 203,000.

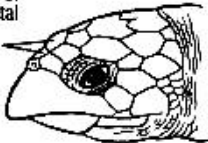
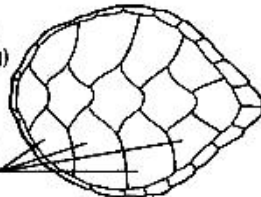
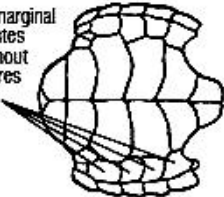
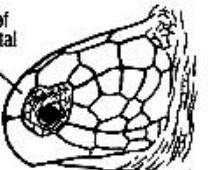
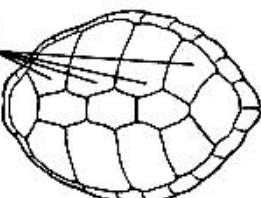
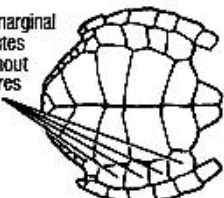
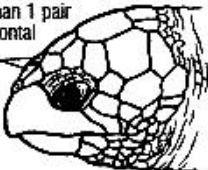
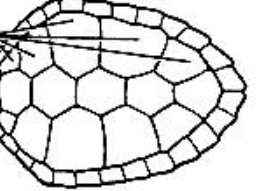
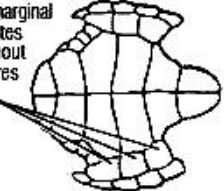

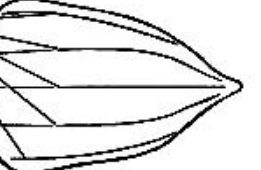
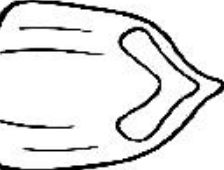
Green sea turtles get their name from the color of their body fat, which is green from the algae (they feed on seagrass beds), they eat. This is their sole diet and they are the only sea turtle that is strictly herbivorous as an adult.

It is the largest of the hard-shelled marine turtles. Adults weight around 150kg (330 pounds) and measure over 1m (3 feet)! Individuals reach sexual maturity at around 25 years old - sometimes taking up to 50 years. The nesting females usually return to their home beach in intervals of 2, 3, or more years, and lays an average of 115 eggs in each nest, which is about 50cms (19 inches) deep. It can lay as many as 5 times in a season at 11 to 18 day intervals. The eggs hatch after about 60 days of incubation.

### **When to find each species in Cahuita/Playa Negra?**

<b>Leatherback:</b>	March – July	100-300 nests
<b>Hawksbill:</b>	May – November	15-90 nests
<b>Green:</b>	June – October	5 -25 nests

# SPECIES IDENTIFICATION

head	carapace	plastron
<p>2 pairs of prefrontal scales</p> 	<p>scutes imbricated (overlapping)</p> <p>4 lateral scutes</p> 	<p>4 inframarginal scutes without pores</p> 
<p>1 pair of prefrontal scales</p> 	<p>4 lateral scutes</p> 	<p>4 inframarginal scutes without pores</p> 
<p>more than 1 pair of prefrontal scales</p> 	<p>5 lateral scutes</p> 	<p>3 inframarginal scutes without pores</p> 
<p>no scales</p> 	<p>ridges</p> 	<p>no scutes</p> 
<p><b>Leatherback - <i>Dermochelys coriacea</i></b></p>		



## WORK OVERVIEW











### TRAINING

On arrival at the Project volunteers will receive training on conservation and monitoring techniques for Marine Turtles nesting at Playa Negra and Cahuita and which include how to use the equipment and how to approach the turtles without disturbing them. The work methods and equipment are very simple and you should feel comfortable with the work after a couple of nights on the beach working directly with the turtles. For most of your time you will be working with an experienced person, who will be able to show you the finer points of working with turtles, handling eggs and data collection.

### THE WORK

The aim of the volunteer program is to assist the project staff in:

-  Patrolling the beach in order to protect nesting turtles and their nests from predators and poachers.
-  To relocate eggs which are threatened by beach erosion or poachers, to safe locations such as the hatchery or to relocated and camouflaged nests nearby on the beach.
-  Collect all research information on the nesting behavior of the turtles (nest location, size of egg clutch, length and width of turtle, etc).
-  Construction, monitoring and safeguarding of the hatcheries.
-  Monitor nests that have been relocated to the protected beach hatcheries.
-  Assist with the exhumation of nests and the release of hatchlings.
-  Maintain nesting areas by participating in beach cleaning.
-  Help educate members of the public or local communities who may visit the project and hatcheries.

### WORKING HOURS

Work will be split into two main working areas; night patrols and beach cleaning.

**Night Patrol:** The beach we work in is divided in two sections: Cahuita and Playa Negra. The total beach length is 8.1Km, where 5.4Km belong to the Cahuita sector. Although it is the same project, the two sectors are run separately, and during your time as a volunteer, you will only have to patrol one of the beaches (depending on the beach of your choice).

Patrol shifts will be 4-5 hours long, and will be coordinated in advance between 8pm and 4am.

*The patrols will only be canceled in situations of extreme bad weather, risks for anyone's safety, and volunteers are expected to take part on every patrol they are assigned to. Only in specific situations a volunteer may be dismissed from their task.*

**Hatchery:** One hatchery will be in operation in Cahuita sector. The hatchery must be monitored at a regular basis during the day, and safeguarded from 6pm-6am.

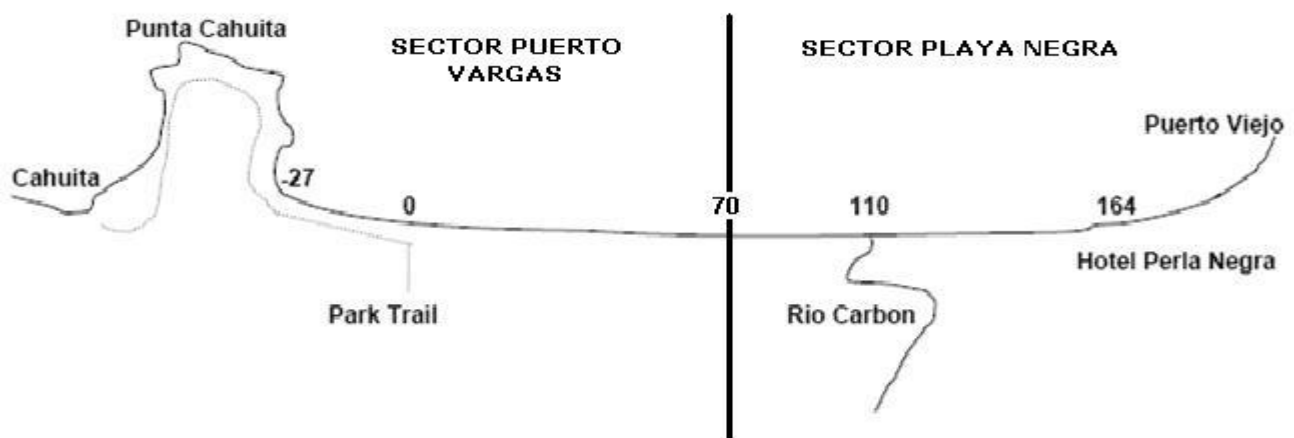
**Morning Survey:** Once the first hatchlings are expected, the nests must be monitored every morning to register hatchling activities and check any signs of predation. Surveys are scheduled for as early as 5a.m.

**Exhumations:** Every nest, after the last few hatchlings are born (around 10 days after the first one hatches), must be exhumed, to record hatching success. Only experienced volunteers may carry out this task. Excavations should take place early in the morning, in the case you need to liberate any hatchlings.

**Beach Cleaning** The beach is constantly being filled with wood debris brought by the nearby rivers, reducing the nesting area available for turtles, as well as presenting risks for the turtles and the hatchlings (e.g. acting as barriers on the beach). Beach cleaning will take place either in early morning, or mid afternoon, on 4 hours shifts.

***PLEASE NOTE:*** *There may be times when volunteers will be asked to work longer hours than those outlined above. Also we can not guarantee direct work with a turtle every night of your stay. It may be necessary to work during bad weather conditions, and at Playa Negra site, depending on the conditions, you will have to wade through a river which may be up to your chest.*

### **GENERALIZED MAP OF MONITORING SITE**



**Leatherback Nesting Site: 0 to 164**

**Green and Hawksbill Nesting Site: 70 to -80**



## NIGHT PATROLS AND HATCHERY DUTY



### NIGHT PATROL:

The **leatherback** season for volunteers is from March to the end of July and nightly patrols take place from both ends of the main section of open beach.

Teams leave from beach marker (mojon) -27 at the MINAE base at the north end, with other teams leaving from the ANAI house on Playa Negra in the south at mojon 164 (the end of the patrol beach). The patrol area from Mojon 0 to 160 is 8kms (5 miles). There is a river to cross nearer the Playa Negra end of the patrol beach.

During the **hawksbill** season from the end of July to November, only the Puerto Vargas sector is operated, and night patrols focus on the Punta Cahuita headland section and up to 4Km south of Puerto Vargas, heading towards Playa Negra. The approximate length to be patrolled is 6kms (3.7 miles).

Patrol schedules: These may vary due to the different turtle seasons, some examples as follow:

**8pm – 1am 9pm – 2am 10pm – 3am 11pm – 4am**

During the **hawksbill** season, volunteers may also be scheduled for early morning patrols or if some sections are unreachable safely at night due to heavy flooding.

### USE OF LIGHT

It is a general rule for the entire Central American Region that only red lights are used on the nesting beaches. Exceptions include:

- a. Cases of emergency, when it is necessary to send a message to adjacent patrols.
- b. When working with the PIT scanner.
- c. When looking for egg poachers in the vegetative zone behind the beach.

### WHILE YOU ARE WORKING WITH A TURTLE:

- ◆ Never take a picture of the turtles using a flash or other artificial lights
- ◆ Never walk or stand in front of a turtle
- ◆ Never shine a flashlight in a turtle's face
- ◆ Never allow strangers to join the patrol and don't give any information about the work, just pass the basic information
- ◆ Never drink alcohol before you go on duty and never arrive for patrol drunk
- ◆ No use of illegal drugs will be tolerated
- ◆ Always arrive 15 minutes earlier for patrol
- ◆ If you encounter poachers, report it to ANAI staff, never deal with them by yourself
- ◆ If you encounter a sea turtle in the daytime photo's are allowed, however respect the turtle at all times
- ◆ **Never use repellent** while working with the turtles or their eggs.



## A TURTLE IS FOUND!



The leader is responsible for the work methods used for each turtle, the patrol team and collection of research information. When on patrol please follow your team leaders instructions. **Always** wear shoes, **always** walk behind the team leader and **never** approach a turtle before the leader or without their instructions.

If, when you first encounter a turtle, it is still making its way up the beach, then care needs to be taken not to frighten it, making it return to the sea. You should keep well away from the turtle, keeping quiet and not use your flashlight. Once the turtle has selected her nest site it will be the responsibility of the patrol leader to approach the turtle and decide when it is safe to start work.

Once the turtle has selected her nest site and dug her body pit she will then begin to excavate the nest hole. She does this using her rear flippers, digging alternately with each flipper.

At this stage it is now safe to approach the turtle and **prepare** to carry out all necessary work. If you are instructed to collect the eggs for relocation position yourself so that you can place the bag into the hole when the turtle is ready to begin the egg laying process. If you are not removing the eggs you should still be in a position to count the eggs as they are laid.

In the case of the **LEATHERBACKS**, when the hole is complete the turtle will cover the hole with one flipper just before she starts to lay. This is your sign to place the bag into the egg chamber so the eggs fall directly into the bag. To do this gently hold the flipper covering the hole to one side and insure that the bag is correctly placed to collect the eggs. While this is happening another team member should be measuring the depth and diameter of the egg chamber. Also this is the time to use the scanner to check for any PITs (Passive Integrated Transmitter) and in the case the turtle has not got one, apply one and get a tissue sample from one of the back flippers. **This work is only carried out by an experienced field worker!**

The turtle will lay around 110 eggs, 80 being large fertile eggs the remainder small infertile ones which she lays last. When small eggs are being laid this is your sign to be ready to pull the bag from the hole. The bag can be heavy so if you need help insure that another team member is standing by. Once the last egg is laid, close the bag and pull it from the hole. **No other work with the turtle should be done until the egg laying process is finished.**

If the patrol has encountered a nesting **HAWKSBILL** or **GREEN** sea turtle nesting, the leader will place a metric tape inside the nest chamber, and the patrol members will wait until the egg laying process is finished to dig the nest and collect the eggs.

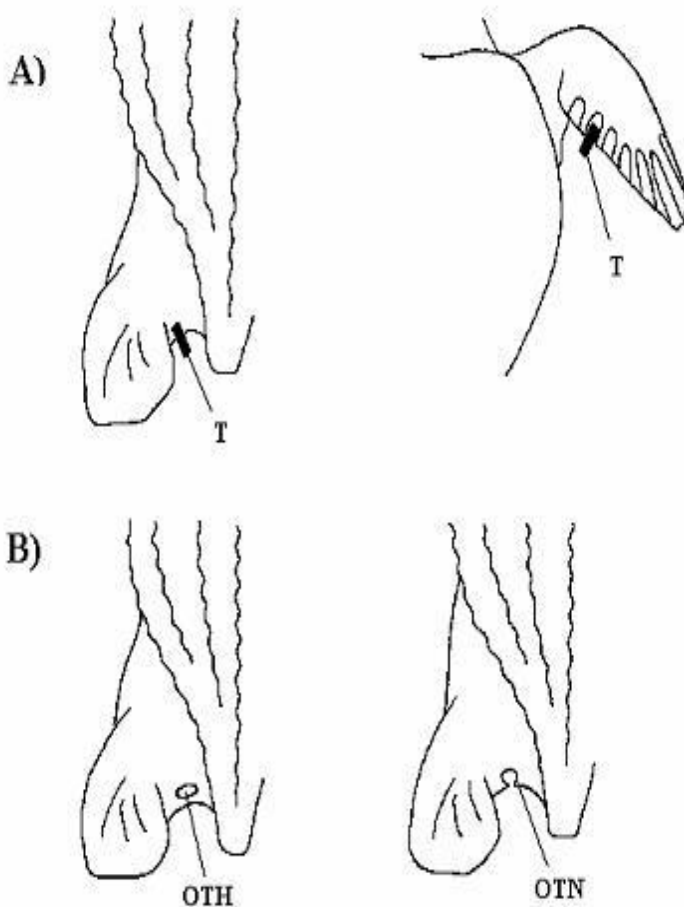
Once the eggs are collected the absolute maximum relocation time should be 1 hour, although it is possible to relocate up to 8 hours after the eggs have been laid. The egg bag should remain closed until the eggs are ready for relocation, in order to keep the eggs warm, and the measurements of the original egg chamber must be used to make the new chamber. Only one person should carry out the task. He or she should move 100 meters away from the nest site, not use the flashlight and brush out all signs of wet sand, foot prints, etc. when they have finished the work.

The remaining volunteers will carry out the rest of the work with the turtle, while the turtle is covering the nest. It involves applying identification tags (if the turtle has not got any) and measuring the length and the width of the carapace.

After the work is done, you should try to clean up the tracks a bit, to avoid confusion between patrols, and leave the turtle alone, minimizing disturbance.

### EXTERNAL TAGGING:

All nesting females tagged on the membrane between the tail OR flipper, according to the following regulations:



- a. The **Leatherback** females are tagged on the membrane between the tail and back flippers.
- b. The **Green and Hawksbill** turtles are tagged on the front flippers exactly on the 2nd "axiliary" scale.
- c. All tags are placed with the proper distance between the edge of the skin and the edge of the tag, so that it will not cause friction when the turtle moves.
- d. All tag numbers are read and repeated verbally three times.
- e. All loose tags are replaced, and the relevant data is noted on the data sheet.
- f. The tag whose last number is even is always put on the right flipper and the tag whose last number is odd is always put on the left flipper

### PIT TAGGING (microchip):

PITs (Passive Integrated Transponder) are installed in the **Leatherback** females (only) whenever possible, according to the following protocol:

- a. The project leaders are responsible for bringing the PIT equipment on patrol and marking females whenever possible.

- b. Before installing a PIT, the turtle needs to be checked with the scanner while she is constructing the nest and is done very carefully so as not to disturb her. The leader will check the flippers and the neck of the turtle, making circular movements with the scanner three times in each site. If you find a chip, mark down its number in the field data book. If you do not find a chip, continue with the marking process.
- c. The leader will complete the process of injecting the cleaned and sterilized shoulder of the turtle with the microchip for identification purposes, and verify the placement of the chip with the scanner.

### **TISSUE AND DNA SAMPLES:**

Immediately after the female begins to lay her eggs and before she begins to cover the nest, the leader will prepare to take a tissue sample for DNA testing.

Volunteers may be asked to assist the leader with this process.

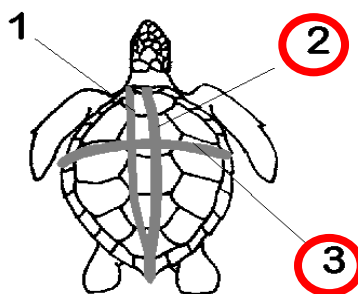
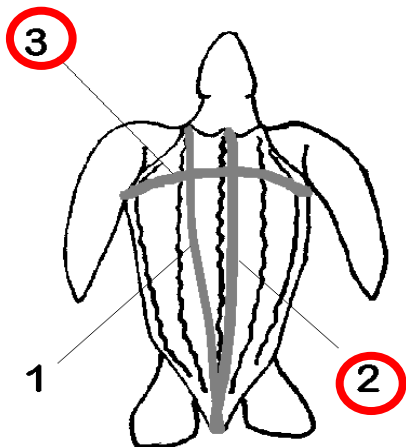
### **BIOMETRY:**

All measurements of length and width of the females are taken after she finishes laying the eggs, never before. Measurements may be taken if the patrol finds her returning to the sea and is sure that she has already nested.

#### **Do not measure females when:**

- a. They have just left the sea.
- b. They are in the process of constructing a nest.
- c. They are in the process of laying eggs.
- d. They are returning to the sea after deciding not to nest.

Measurements of females in motion are generally imprecise and produce untrustworthy data. All measurements must be taken three times and repeated "loud and clear" to the data recorder. If the female has lost part of the back portion of her carapace, this should be indicated in the data book. However, the recorded length should be the measurement of the whole carapace, including the missing portion. In other words, the female's original size is the data that must be entered into the database. If she is measured as less, this will warp the data.



The leader is responsible for reviewing the information recorded in the data book, in order to ensure high-quality work and the accuracy of the data.





## RELOCATION AND CAMOUFLAGING OF NESTS



Playa Negra and Cahuita, where the main problems are illegal egg collection and erosion, the proven methods of conservation are as follows: 1) removing the nests in high risk erosion zones to safer areas, and 2) erasing or camouflaging the evidence of nesting in order to confuse egg collectors.

The nests should whenever possible, be relocated to a safer site on the beach. In case of intense human presence, or poaching of nests, the nests should be relocated even if they are originally laid in a "safe" area of the beach.

**The leatherback eggs should be relocated to the high tide area of the beach, the green turtles nests near the vegetation line, while the hawksbills nest closer to the forest.**



### NEST RELOCATION:

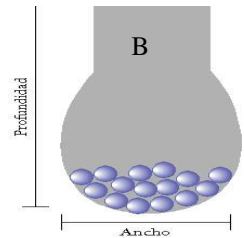
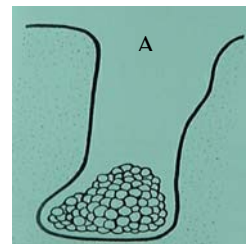
Collecting eggs from a natural nest and relocating them to an artificial nest is done as follows (leatherbacks):

- Measure the depth and width of the nest.
- Wait until the female finishes constructing the nest and covers the hole with one of her flippers. carefully place the plastic bag in the hole.
- After the infertile eggs begin to fall and the female moves her back flipper to begin covering the eggs with sand, this is the moment to remove the bag.

### **The structure of the nests:**

All the leatherback nests on the beach are constructed in the form of a "boot" (A), while all the green and hawksbill turtle nests are made in a "pear" shape (B).

Leatherback: 75 cm deep  
 Green: 50 cm deep  
 Hawksbill: 40 cm deep



### **Ensure that in the area which the nest is relocated to:**

- There is no driftwood around.
- They are not close to permanent or intermittent streams or rivers.
- There are no plant roots in the sand nearby that could interfere with the nest.
- There are no paths or trails nearby.
- There are no houses nearby.

## HANDLING THE EGGS:

When you receive a bag of eggs, keep the bag closed to avoid heat loss. Handle the bag very carefully.

If the eggs are from a hawksbill or green turtle (Type B), you must select a space at the back of the beach, while if the eggs are from leatherback turtle dig the nest in the form of a boot (Type A), with the depth and width written on the tag accompanying the bag of eggs.

During this process you must **ALWAYS** use latex gloves. Do not handle the eggs more than necessary.

Count the eggs by type (infertile and normal) as you transfer them from the bag to the hole, noting the numbers and the nest code in the data book. First transfer the normal eggs (the larger ones) and later the infertile ones (smaller). Never allow the eggs to come in contact with dry sand.

After transferring the eggs, cover them with moist sand to a thickness of at least 40 cm and press lightly to compact it. Next cover the entire hole with sand and compact it. Remember to write all information in the proper data book.

If you see that a nest hatched the night before, confirm the location of the nest, and make a note of the nest code, the date, and the number of tracks found.

## THE HATCHERY

Hatcheries are built for a greater control of and increased chance of hatchlings, although many nests are left natural or relocated and camouflaged on the beach. Apart from protection from poachers and natural predators, hatcheries serve to protect nests from the changing dynamics of the beach. From day to day, eroding waves and watercourses caused by excessive rainfall can destroy nests. **They are also used with educational purposes, display areas; used also to study in more detail parameters that may affect nest incubation and hatching success.** The two hatcheries constructed at Gandoca for the 2004 leatherback season produced an exceptionally high 88% success rate for hatchlings, compared to 54% for nests left natural on the beach.

## BUILDING A HATCHERY

When the appropriate site is selected and small trees and debris removed, the process of sifting the sand commences. This may take a week or more to remove foreign objects, predators and tree roots from the sand, allowing greater aeration of nests. The hatchery sand is sifted to a depth of approximately 1m (3 feet) with additional sand built up on top to a total height/depth of 1.2m as a typical leatherback nest may be up to 80cms deep.

### **Hatchery construction**

- Size may vary but 10m x 7m (30 x 21 feet) is standard
- Wire mesh is placed at least 50cms (1.5 feet) below the sand to prevent predators
- Black shade cloth may cover half of the hatchery for a balance of nest temperatures

- Internal grid markings are 50cms (1.5 feet) and alternate squares are used for each nest
- Circular wire mesh nest covers (canisters) keep predators out and hatchlings in
- A secure door and is built
- Sandbags are placed in front of the hatchery and a trench dug for the encroaching tides
- Adjoining hut for storage of monitoring equipment and for volunteers on hatchery duty

**Day / night activities for volunteers on hatchery duty**

- Relocation of eggs to the hatchery, digging nests to specifications
- Monitoring of internal nest temperature thermocouples every six hours
- Monitoring nest canisters for emerging hatchlings
- Removal of predators such as small crabs
- Education of visitors to the hatchery

**HATCHERY MONITORING AND HATCHLINGS RELEASE**

The nests in the hatchery will be placed following the chess board model, in which there are only 2 nests in each square meter. You must understand this display, as nests will be referred to in code (e.g. J7). Each nest will be labeled with nesting date, nest code and tags of the nesting female.

	1	2	3	4	5	6	7	8	9	1
A	X	○	X	○	X	○	X	○	X	○
B	○	X	○	X	○	X	○	X	○	X
C	X	○	X	○	X	○	X	○	X	○
D										
E										
F										
G										
H										
I										
J							●			
K										
L										
M										
N										

***Volunteers receive full hatchery training and detailed explanations upon arrival***

When you see hatchlings emerging, dig up the sand of the nest down to 40 cm in depth. Never touch or remove the eggs. Do not pull up the hatchlings; rather, liberate them by removing the sand around them. **Do not dig up nests except when you see a baby turtle emerge.**

When there are no more little turtles to liberate, cover the hole again with moist sand and compress lightly. For the entire process of liberating turtles, ALWAYS use latex gloves and do not handle the hatchlings excessively.

**Taking flash photos, use of white light, and taking videos are strictly prohibited.**

Of each nest, you must measure and weight **15 hatchlings ONLY**.

Liberate the turtles immediately after counting and measured them. To do this, walk a distance to the north or south, never using the same site twice (this stimulates predation in the sea).

Place the baby turtles on dry sand at least 5 meters above the reach of the waves on dry sand. This is so the turtles will remember the necessary biological parameters for their return to the same nesting beach. Never put them near the sea or in the sea.

Avoid turning on your flashlight for at least 20 minutes after the release, especially when close to the turtles. Light can disorient them so that they walk towards the forest rather than the sea.

If the turtles are born during the day, put them in the big white box with the black interior (to be released later). Put new, moist sand in the box, place the baby turtles inside, and cover the box. The darkness and humidity cause the baby turtles to remain quiet and conserve energy. They can be liberated at 6 pm. Do not open and close the box, and avoid handling them excessively. This will cause them to lose energy.



## SAFETY RULES



- ! Shoes must be worn at all times when patrolling at night. Used needles are occasionally found and even small tree roots and sticks poking up in the sand directly in front of you in the dark can cause serious foot injuries which may take months to heal in the moist conditions. Remember – you cannot work if you cannot walk!
- ! **NO ONE WALKS THE BEACH AT NIGHT BY THEMSELVES.** This is an ANAI policy as you may be approached by strangers, be washed out to sea by a wave, fall over and hurt yourself or may even be approached by wild animals.
- ! Walking the beach by yourself during the day is allowed but it is best if you can take someone with you - especially if heading to the river entrance at Hone Creek. Do not take any personal belongings with you if possible as this invites robbery. If you are approached by what you perceive to be dangerous locals, tell them if asked that you are not a tourist and that you are working with MINAE and ANAI. Do not start a confrontation.
- ! Swimming during the night is forbidden. When swimming during the day, never enter the water where the beach drops away into the sea, as this is where strong rips are likely. Choose a flat section of beach to enter the water. It is best to swim directly out the front of the MINAE base. Swimming at Punta Cahuita is fine but the current is strong sweeping around the coral point. There are also small reef sharks out further and be looking for sea snakes. The white-faced monkeys will steal any items you leave at Punta Cahuita. Do not swim in the river at Hone Creek. The locals are very possessive of this area and besides; the water may not be that clean with pesticides from the banana plantations flowing into it.

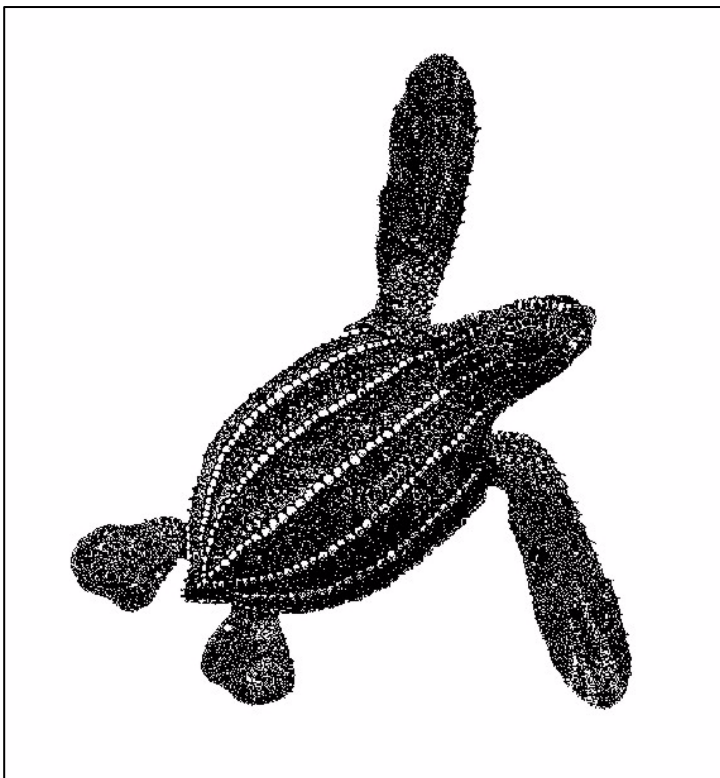


## TURTLE GLOSSARY / GLOSARIO



ESPAÑOL	ENGLISH	ESPAÑOL	ENGLISH	ESPAÑOL	ENGLISH
Tortuga	turtle	huevos	eggs	nido	nest
tortuga baula	leatherback turtle	tortuga carey	hawksbill turtle	tortuga verde	green turtle
Blanca	white	negra	black	albino	albino
Arena	sand	playa	beach	marea	tide
mar	sea	alta	high	baja	low
Luna	moon	arboles	trees	troncos / madera	timber
Mojones	beach markers	rastro	track	rayon	false crawl
Lluvia	rain	sol	sun		
depredador	predator	chanchó	pig	mapachin	raccoon
frigata	frigate bird	cangrejo	crab	pizote	pisote
pescaador	fisherman	huevero	poacher	hormiga	ant
pequeña	small	mediano	medium	grande	big
techo	roof	alambre	wire	mallá	mesh
martillo	hammer	clavo	nails	cribar	to sift / seive
palangana	bucket	vivero	hatchery		
hueco	hole	aleta	flipper	marcaje	tag / marker
profundidad	depth	ancho	width	daños	scar
observadores	observers	emergiendo	emerging	hacendo cama	digging body pit
poniendo huevos	laying eggs	cubriendo el nido	covering the nest	camuflando	camouflaging
regresando al mar	returning to the sea	estado	state	contar	to count
relocalizar/reubicar	relocated	abortado	aborted	no vista	not seen
posicìon	position	marcas	marks	exhumaciòn	exhumation
emergencia	emerging	desarrollo	development	muerta	dead
viva	live	foco	torch / flashlight	bolsa	bag

**SEA TURTLE CONSERVATION PROGRAM  
SOUTH CARIBBEAN COAST  
COSTA RICA**



Address of the project in San  
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