



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,  
and the educated use of natural resources in the tropics.

## Marine Turtle Monitoring Program- Daytime Protocol Playa Norte, Tortuguero

### 1 INTRODUCTION

Marine turtles have been nesting on the beaches of Tortuguero for hundreds of years. Archie Carr began his studies of green turtles (*Chelonia mydas*) in Tortuguero in 1954 and since 1958 the Caribbean Conservation Corporation (CCC) has continued work on green turtles. Although Tortuguero and the Tortuguero National Park (TNP) are most well known for its population of green turtles, it does have a population of leatherback turtles, hawksbill turtles (*Eretmochelys imbricata*) and the occasional loggerhead turtle (*Caretta caretta*). Due to this, in 1995 the CCC began its work on leatherbacks.

Located about 7km north of Tortuguero inside the Barra del Colorado Wildlife Refuge is the *Estación Biológica Caño Palma* (EBCP), owned by the Canadian Organization for Tropical Education and Rainforest Conservation (COTERC). Since its creation in 1990, COTERC has been interested in developing a marine turtle monitoring programme on Playa Norte which is located on the north side of Laguna Tortuguero.

In 2004 and 2005 COTERC undertook a feasibility assessment in order to establish the significance of the population of marine turtles nesting on Playa Norte and establish whether this number warranted a project and significant protection. After this period it was deemed a viable option to initiate a long term marine turtle monitoring programme with the assistance of Global Vision International (GVI).

Management of both the wildlife refuge and national park are becoming increasingly important in relation to tourism management. The numbers of tourists visiting the national park has increased from about 49,000 in 2000 to over 103,000 in 2006 (Allan Valverde, written comm. 2007). Between 1988 and 2002, tourist numbers visiting the park grew at an annual average rate of 16 percent (Tröeng 2004). This increase in visitors to the national park has a trickle down effect to the reserve and Playa Norte. Development along Playa Norte has been steady over the past few years with the development of two hotels and several homes. This number is likely to increase and hence may have a long term impact on the marine turtles nesting on the beach.

It is hoped that with a greater understanding of the dynamics of Playa Norte and its associated marine turtle population that this project can help contribute to an informed approach to the management of Playa Norte, the wildlife refuge and the area of Tortuguero.



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,  
and the educated use of natural resources in the tropics.

## TABLE OF CONTENTS

1	INTRODUCTION.....	i
2	PROJECT AIMS.....	1
3	MORNING TRACK CENSUS METHODOLOGY.....	1
3.1	Study Site.....	1
3.2	Equipment Needed.....	2
3.3	Equipment Maintenance.....	2
3.4	General Information.....	2
3.4.1	Turtle track seen the night before.....	3
3.4.2	Turtle track not seen the night before.....	3
4	HATCHLING ORIENTATION.....	5
4.1	Hatchling orientation methodology.....	5
4.2	Data Recorded for Hatchling Orientation.....	5
5	DEAD TURTLES OR TURTLE BODY PARTS METHODOLOGY.....	5
6	NEST EXCAVATION METHODOLOGY.....	6
7	BEACH MEASUREMENT.....	6
8	HEALTH AND SAFETY.....	6
9	APPENDIX.....	7
9.1	A: Identifying Turtle Tracks.....	7
9.2	B: Identifying signs of poaching.....	8
10	REFERENCES.....	8
11	ACKNOWLEDGEMENTS.....	8



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,  
and the educated use of natural resources in the tropics.

## 2 PROJECT AIMS

The overall aim of this programme is to be a leader in the long-term conservation of marine turtles in the area of Playa Norte and to ethically gather valuable scientific data on the nesting marine turtles.

The programme's specific conservation aims are to 1) reduce poaching rates and 2) educate the community and tourists about marine turtle conservation, including appropriate behaviour on the beach.

The programme's specific scientific aims are to 1) gather selected biometric data on nesting marine turtles, 2) record the spatial and seasonal distribution of nesting females, 3) monitor the number of nests and half moons, 4) determine the level of illegal poaching on turtles and their nests, 5) record hatchling emergence and hatching success rates, 6) monitor for the apparent physical health of nesting females, 7) track re-emergences to the nesting beach and migration between beaches, and 8) register tourist and human development around the nesting site.

## 3 MORNING TRACK CENSUS METHODOLOGY

### 3.1 Study Site

The study area is located within Playa Norte and encompasses the 3 1/8 mile (~5 km) long sandy beach that extends from the Tortuguero River mouth (10°36'36.9"N - 83°31'52.1"W) on the southern end to Laguna Cuatro (10°37'56.3"N - 83°32'25.7"W) at the northern end. This beach is located within the Barra del Colorado Wildlife Refuge, which like TNP, is managed by ACTo (Area de Conservación Tortuguero), part of the Costa Rica Ministry of Environment and Energy (MINAE).

The study area is marked as mile 0 at the Tortuguero River mouth and mile 3 1/8 just north of Laguna Cuatro. The length of the beach is divided and marked with mile-markers at every 1/8 of a mile (approximately 200 meters). The mile-markers run in ascending order from the south to the north to allow for the documentation of spatial distribution and density of nests along the beach. A map of the study site is located in appendix A, map 1.

The nearest village to the study site is San Francisco, a constantly growing community of about 274 residents (van Oudenhoven, 2007), situated south of mile 0. Two hotels, Cabinas Vista al Mar and Turtle Beach Lodge, and several houses are located along the study beach. There is a road that runs parallel to the beach the entire length of the study site which is used by those on foot, bike, horseback, and car. On the southern side of the Tortuguero River mouth is Tortuguero beach, which the CCC monitors from mile 0 to Jalova lagoon at mile 18.

The dominant plants on the nesting beach are morning glory (*Ipomoea pes-caprae*), re-a-purslane (*Sesuvium portulacastrum*) and rush grass (*Sporobolus virginicus*). The berm is bordered by a hedgerow of cocoplum (*Chrysobalanus icaco*) and sea grapes (*Coccoloba uvifera*) with a mixture of coconut palms (*Cocos nucifera*) and



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,  
and the educated use of natural resources in the tropics.

various tropical hardwoods behind. The beach is littered with a variety of debris including logs, coconut husks and a large amount of plastics, bottles, and garbage in general.

## 3.2 Equipment Needed

The following equipment should be taken on all morning patrols:

- Notebook and pencil
- GPS and extra batteries
- Camera
- 50m tape measure, hatchling orientation book, flagging tape, and compass (once hatchlings start emerging)

## 3.3 Equipment Maintenance

Each day when returning back to base all equipment must be cleaned and dried in order to keep it in good condition throughout the season. When it has been used, the 50m tape should be unwound, rinsed off, dried, and wound back up. All sand should be cleaned from all bags and the data book. Any damage to any equipment should be reported and dealt with immediately.

## 3.4 General Information

The project will be conducted during the nesting seasons of the leatherback sea turtle, from March to June, the green sea turtle, from June to November, and the hawksbill and the loggerhead sea turtles, from May to September. Hatchling watches and excavations will take place through December.

The survey will start early in the morning at sunrise and will consist of at least two people and minimum one Patrol Leader (PL). Before the survey starts, the species, record type, GPS coordinate and mile of any tracks seen the night before should be recorded in the notebook. Date (of the previous night), start time, end time (at mile 3 1/8), and team members initials should be recorded during each survey.

The patrol team will walk as a group starting at mile 0 and head north. It is important that they walk in a way that they can see the entire width of the beach. When a turtle track is found it should be determined if it was seen the night before or not. For leatherbacks and hawksbills the track should already be rubbed out if it was seen the night before. For any other species there should be a line or symbol drawn across the ascending and descending tracks if it was seen the night before.

If no tracks are seen during the morning census "NRC" for "No Records" should be written.



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,  
and the educated use of natural resources in the tropics.

## **3.4.1 *Turtle track seen the night before***

Once it is determined that the track was seen the night before the following information should be recorded:

- Species (from last night already written in the book)
- GPS coordinate and closest northern mile marker with the GPS (from last night already written in the book)
- Record type (from last night already written in the book)
- Signs of poaching, erosion, or predation
- Natural, Poached, Eroded, Predated, or Unknown

Once all data has been taken be sure to rub out any tracks being careful not to step on the actual nest. All leatherback, hawksbill, and loggerhead nests should be disguised.

## **3.4.2 *Turtle track not seen the night before***

If a track was not seen the night before it needs to be determined if it is a nest, half moon, or lifted turtle. If a track is only ascending with no turtle present it is assumed to be a lifted turtle. If a track is ascending and descending it must be determined if it is a nest or half moon. If there are no signs of nesting or if the body pit is very shallow with very little sand spray it is deemed a half moon. If there is a deeper body pit and plenty of sand spray it is deemed a nest. When in doubt, record it as a half moon, take plenty of pictures and have others help identify it. Record if there was an attempted body pit.

The species of the turtle must also be determined. Please see Appendix A for assistance.

### **3.4.2.1 Nest**

In the case of a nest, record it as such and collect the following information:

- Species of turtle
- GPS coordinate and closest northern mile marker with the GPS
- Vertical position of the nest. It is marked Vegetation (V) if it is located in the vegetation and therefore receives almost no direct sunlight, Border (B) if it is shaded at some time of the day, or Open (O) if it receives almost no shade during the day.
- Evidence of poaching such as small holes pierced in the sand, human or animal tracks, large hole dug in sand, egg shells around nest from recently eaten eggs, the presence of flies or sand patted down or disturbed indicating a covering of a raided nest.



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation, and the educated use of natural resources in the tropics.

- Record nest as poached if there is a large hole (where the eggs presumable were) or if there are fresh egg shells outside the nest, predated if it was predated by dogs, coati, or other animals, eroded if it has been eroded by the sea, otherwise record it as natural. It may be recorded as unknown if there is high suspicion of poaching but no concrete evidence. For example, a nest would be marked as unknown if there were stick holes, flies, human prints, dog prints, and the sand looked disturbed.



Green turtle nest



Green turtle nest

### 3.4.2.2 Half Moon



In the case of a half moon record it as such and the following information should be recorded:

- Species of turtle
- GPS coordinate and closest northern mile marker with the GPS
- Presence of attempted body pit

### 3.4.2.3 Lifted Turtle

In the case of a lifted turtle record as much information as possible including:

- Species of turtle
- Whether the turtle has nested or not
- GPS coordinate and closest northern mile marker with the GPS
- Vertical position (if it has nested)
- Comments



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,  
and the educated use of natural resources in the tropics.

## 4 HATCHLING ORIENTATION

Orientation of hatchlings is taken to determine if hatchlings are more disoriented in areas of high light disturbance or not.

### 4.1 Hatchling orientation methodology

This will be completed during the morning survey if hatchling tracks are seen.

Sticks will be placed in four locations in the hatchling tracks, each at a distance of 10m from the nest: two sticks in the outermost tracks (not including the outliers); two sticks in the tracks bordering the majority of the hatchling tracks. If it is not possible to place sticks 10m from the nest (due to high tide) then they should be placed as far as possible from the nest (but all at the same distance); this must be noted in the field book.

Standing at the location of the nest, the degrees from north of the four sticks should be taken using a compass.

Measurement of the high tide line is also taken for reference.

### 4.2 Data Recorded for Hatchling Orientation

The following data will be collected for all hatchling orientation

- GPS coordinate directly over the egg chamber and closest northern mile marker
- Nest number: Code given during triangulation, if no code write a --- (dash) do not leave blank.
- Number of tracks observed
- Number of alive hatchlings
- Number of dead hatchlings
- Number of circles counted in the tracks (indicating hatchlings might have been confused by light sources other than the waves)
- Number of outliers: Number of tracks found outside of where the majority of hatchlings approach the sea.
- Number lost: Number of tracks heading towards the vegetation
- HTL: Distance to high tide line

## 5 DEAD TURTLES OR TURTLE BODY PARTS METHODOLOGY

If a dead turtle or body parts are found on the beach be sure to note the specie, CCL, CCW, sex, state of turtle and estimated time of death. Look for obvious signs of an unnatural death like harpoon marks in head or trauma to shell



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,  
and the educated use of natural resources in the tropics.

or limbs. Photos should be taken for files. Open the mouth and examine the interior as well as the neck. Check for identification tag in all flippers and record.

## 6 NEST EXCAVATION METHODOLOGY

Every leatherback nest that was triangulated will be excavated 75 days after nesting, every hawksbill nest 80 days after nesting, and every green or loggerhead 70 days after nesting. The measurements made during triangulation should be used to find the nest.

In addition to this, any time hatchlings are found the nest will be marked with sticks on either side of the egg chamber and flagging tape on the sticks. The nest will then be excavated two days later.

A measurement will be taken from the top of the sand to the top of the egg chamber and then from the top of the sand to the bottom of the egg chamber. The egg chamber will be emptied out and the remains recorded as one of the following: hatched egg (more than 50% of the shell is still together), alive hatchling, dead hatchling, un-hatched egg with no embryo, stage 1 (un-hatched egg with embryo filling up to 25% of the egg), stage 2 (un-hatched egg with embryo filling up 25-50% of the egg), stage 3 (un-hatched egg with embryo filling up 50-75% of the egg), stage 4 (un-hatched egg with embryo filling up 75-100% of the egg), pipped eggs, and yolkless eggs. At times it may be difficult to determine the stage of an egg because of a high level of predation. In these cases the stage may be recorded as unknown. It should also be recorded how many eggs have been predated by larvae, ants, bacteria/fungi or other. Notes are also taken on any twins, albinos, or deformed embryos.

If all eggs are not found it must be determined if it was poached, partially poached, predated, or unknown.

## 7 BEACH MEASUREMENT

Once every month after high tide the width of beach is to be measured at each mile marker. This should be done on the day of the month with the highest tide. It should be measured from the mile-marker to the high tide line.

## 8 HEALTH AND SAFETY

Because the surveys are conducted during the day health and hydration should be of top priority. The following should be brought on survey:

- Closed-toed shoes
- 2L of water
- Sun block
- Poncho
- Appropriate sun protection (hat, sarong, etc)

*\* Be sure to rest when necessary and take cover during storms (Turtle Beach Lodge and Cabinas Vista al Mar are both options).*



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation, and the educated use of natural resources in the tropics.

## 9 APPENDIX

### 9.1 A: Identifying Turtle Tracks

The following lists the width of the tracks and if they are symmetric or asymmetric.

<u>SYMMETRIC</u>	<u>ASYMMETRIC</u>
<b>Leatherback</b> 150-230 cm	<b>Loggerhead</b> 70-90 cm
<b>Green</b> 100-130 cm	<b>Hawksbill</b> 70-85 cm



Leatherback track



Loggerhead track



Green turtle track



Hawksbill track



# Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,  
and the educated use of natural resources in the tropics.

## 9.2 B: Identifying signs of poaching



Photo 1: Stick marks, cavity, and human prints



Photo 2: Cavity and human prints



Photo 3: Stick holes and patted down

## 10 REFERENCES

Tröeng, Sebastian. 2004. Observación de Tortugas marinas es rentable en Tortuguero. Revista Ambientico 126.

## 11 ACKNOWLEDGEMENTS

Special thanks for the work and contributions made by **Global Vision International (GVI)**: <http://www.gvi.co.uk/>

Contact information: 3 High Street, St Albans, Herts, AL3 4ED, UK • [info@gvi.co.uk](mailto:info@gvi.co.uk) • (Phone) +44(0)1727250250

*Last Updated: February 18, 2008*