



# 20 years of sea turtles monitoring by individual identification in Guadeloupe

## ASSESSMENT AND PROSPECTS



Tagged female Hawksbill sea turtle (photo: Evasion Tropicale)

Marc GIRONDOT, Caroline RINALDI & Jacques FRETEY

February 2019

Translated and adapted by Julie Pauwels, chargée de mission pour le PNA en faveur des Tortues marines

## Introduction

Formerly, the Guadeloupe archipelago seas sheltered many thousands of sea turtles and the beaches certainly welcomed large numbers of these reptiles when they came to lay their eggs (Père du Tertre, 1670). Since the beginning of the colonization by the Europeans, these animals were intensively exploited. The rapid demographic increase and the development of tourism has been responsible for the dramatic decline in turtle numbers. Not so long ago, sea turtles were killed to be served in restaurant as a delicacy and their shell and scutes used to make jewellery sold in souvenir shops. Their short-term extinction was foreseeable.

However, in 1991, a ministerial decree was taken to assure sea turtles protection. It banned the capture and consumption of their meat and eggs and made any disruption of individuals illegal. Then, in 1998, the creation of the Réseau Tortues Marine de Guadeloupe (Guadeloupe sea turtles network) brought together the first volunteers and local authorities willing to promote and enhance the conservation of these animals.

In the 2000s, the monitoring of females coming to nest on the Guadeloupe archipelago began. A census of nesting beaches was realized, a monitoring program of nesting beaches was created and the tagging of nesting females started.

Volunteers from associations, interns, protected areas agents and the general public greatly supported and participated in sea turtles conservation actions over the years. It lead to more than 2000 females being tagged and measured on Guadeloupe beaches over the past 20 years. Now is time to explore these data and see what information may arise from their analysis.





Three species of sea turtles come to Guadeloupe beaches to lay their eggs : the Hawksbill sea turtle locally called "Karet", the Green sea turtle or "Toti blan", and to a lesser extent the Leatherback sea turtle also called "Bataklin".

Turtles observed at sea are mainly adults of Green, Hawksbills and Leatherback sea turtles. Juveniles are rarely encountered offshore (Rinaldi, pers. comm.) although in recent years, juveniles of Green and Hawksbill sea turtle have been observed in coastal waters, indicating that Guadeloupe is a place of growth for these two species.

Two other species, the Loggerhead sea turtle and the Olive Ridley sea turtle, are observed, although rarely off the coast of the archipelago.



*Rare photo of a juvenile Leatherback sea turtle*



*Young Green sea turtle*



*Hawksbill sea turtles mating*

*Pictures: Evasion Tropicale*

AFTER 20 YEARS, IT IS TIME TO TAKE STOCK:  
**Have the colossal efforts made improved knowledge and conservation of sea turtles?**

A database of all tagging et re-observation events was collected over 20 years and made available to the Chélonée team to be analysed. After a major cleaning of the database, there were 4048 data lines among which :

-  • 3093 are of **Hawksbill** sea turtles (1536 individuals, 47% of which have been re-observed at least once)
-  • 750 are of **Green** sea turtles (395 individuals, 37% of which have been re-observed at least once)
-  • 196 are of **Leatherback** sea turtles (106 individuals, 45% of which have been re-observed at least once)
-  • 7 are of **Loggerhead** sea turtles (7 individuals)
-  • 2 are of **Olive Ridley** sea turtles (2 individuals)

Too few data were collected for the Loggerhead sea turtle and the Olive Ridley sea turtle to be used in the analysis. In addition, there were only ten lines of data for Saint-Martin and Saint-Barthélemy hence they were excluded from the analysis.

Several parameters describing the life history of each of the three species studied could be estimated, which is a major step forward: the average interesting interval within a nesting season and between nesting seasons, the degree of fidelity to the nesting site within a nesting season and between nesting seasons (beaches 1 to 10 km apart were considered as the same nesting site for this analysis), the growth rate, the average size of individuals and its evolution within a nesting season and between nesting seasons, the survival rate and an estimation of band loss for Hawksbill and Green sea turtles (less conclusive for Leatherback sea turtles due to the limited number of data).

However, it was not possible to produce an estimate of the nesting female population size. Indeed, most individuals were not re-observed, some lost their tags other may have died. Moreover we did not have information on the sampling effort. Adding to the complexity and of sea turtles biological cycle, we could not not provided an unbiased population size estimate.



# Knowledge acquired on The Hawksbill sea turtle

## Size



- Average size of nesting females: **0.85 m**
- Average size of animals at sea: **0.40 m**



## Reproduction



- Average internesting interval : **14-15 days**
- High fidelity to the nesting site: only 1% of females change of nesting site within a season

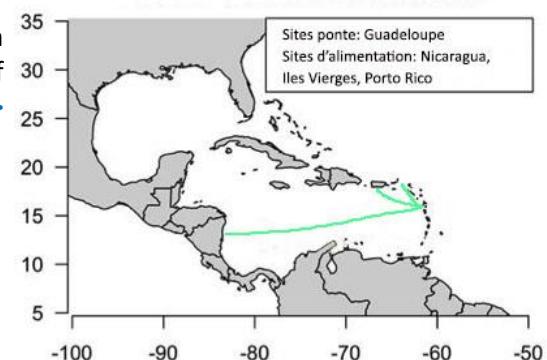
## Tagging



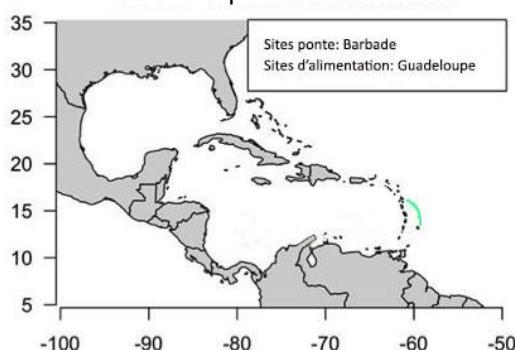
- Low tag loss rate : 2% of tagged individuals lost a tag after 5 years

## 27 cases of exchanges between Guadeloupe and other countries

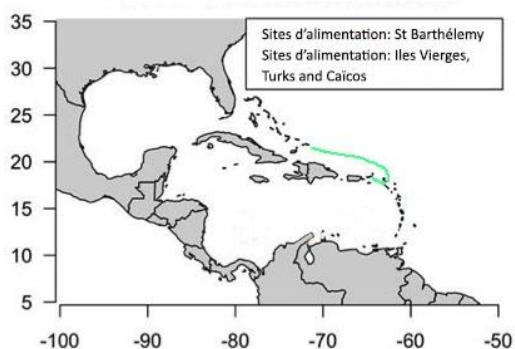
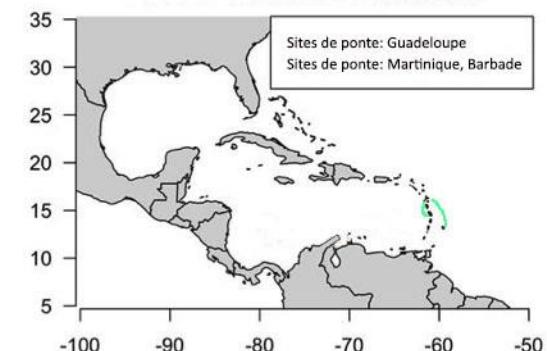
Trips between the feeding areas of Puerto Rico, the Virgin Islands, and Nicaragua and the nesting beaches of Guadeloupe >



Some females nest in Barbados and feed in Guadeloupe v



Some infidelities: a turtle nested in Guadeloupe in 2013 and 2015 and in Martinique in 2014; another nested in Barbados in 2009 and in Guadeloupe in 2013 v



< A turtle feeding in the Virgin Islands in 2004, then in St Barthélémy in 2005; another turtle feeding in St Barthélémy in 2008 then in the Turks & Caicos Islands afterwards (unknown year).

## The Leatherback sea turtle



### Size



- Average size of nesting females: **1,50 m**
- Average size of animals at sea: **1,50 m**

### Reproduction



- Average internesting interval : **8-9 days**
- 20% of females change of nesting site within a season (up to +100km)

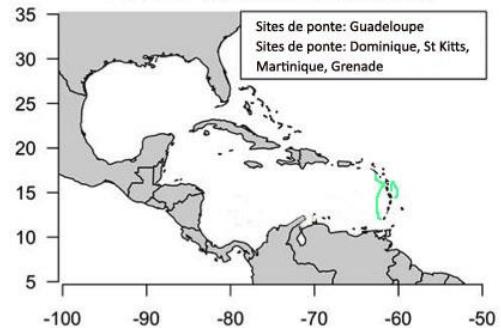
### Tagging



- High tag loss rate : >39% of tagged individuals lost a tag after 5 years

### **18 exchanges between Guadeloupe and other countries**

Several individuals moved between Guadeloupe, Dominica and Martinique that are close by : 7 females nested both in Guadeloupe and in Dominica, 2 changed of nesting sites with Martinique, 1 from one season to another, 1 during the same season. Other individuals made longer journeys, going to St Kitts & Nevis (180 km) and Granada (460 km) nesting beaches.



## The Green sea turtle



### Size



- Average size of nesting females: **1,10 m**
- Average size of animals at sea: **0,55 m**

### Reproduction



- Average internesting interval : **10-11 days**
- High fidelity : only 1% of females change of nesting site within a season

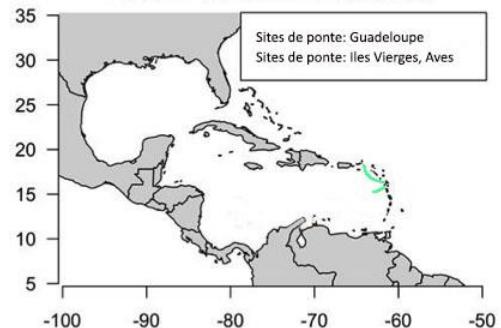
### Tagging



- Low tag loss rate : 2,5% of tagged individuals lost a tag after 5 years

### **8 exchanges between Guadeloupe and other countries**

Changes of nesting sites between Guadeloupe and the Venezuelan island of Aves (located 200 km west of Martinique), and between Guadeloupe and the Virgin Islands, during the same season and from one season to the next.





## The future of sea turtle tagging in Guadeloupe



The individual tagging of sea turtles carried out over 20 years allowed to confirm information suspected or known in other areas on the three species nesting in Guadeloupe (the Leatherback sea turtle, the Hawksbill sea turtle and the Green sea turtle). It also provided information on their fidelity to nesting sites and exchanges with neighbouring territories, although they remain scarce with only 54 cases, confirming that sea turtles conservation management only makes sense at the Caribbean level.

However, the data collected did not allow to assess some fundamental such as the survival rate and the total population size. Despite sufficient data for a few nesting sites, such parameters could not be estimated mainly because of the disparity in females nesting behaviour which makes it impossible to run statistical models and produce relevant results. Although new statistical models are being developed for this type of analysis, they require many parameters that only exceptional situations with a large number of females monitored at many sites to give accurate estimates.

Identification by external tagging is therefore questioned both scientifically and ethically. Flipper tags cause an injury, though locally. The development of fibropapillomatosis (herpes virus) has been observed on individuals at the band location, proving a possible impact on animal health, even if no case has been recorded on the 2000 sea turtles tagged in Guadeloupe over the 20 years of monitoring.

The PIT tags (magnetic transponders injected under the skin) recommended to replace metal tags will not increase animal re-observation which is necessary to run statistical models. They can also be dangerous, through the wound of the injection, which must be healed and glued, and through the magnetic waves emitted for their reading. If the reading is done near the head, it may disturb sea turtles as they use magnetic fields extensively to orient themselves. Photo identification will not provide the necessary and sufficient data to define demographic parameters.

The results obtained such as the average size of the animals observed, their fidelity to nesting sites in the same season and over the years, etc., are of great importance for educational purposes for field actors and the general public, allowing them to better know the 3 species of sea turtles they can encounter. However, if the aim is to follow the evolution of population trends, we recommend continuing and improving sea turtles tracks monitoring on nesting beaches as it has more chances to achieve this goal and does not impact the animals.



## Acknowledgements

We deeply thank everyone who contributed to data acquisition : the associations AEVA, Ecolambda, Evasion Tropicale (with the help of Planète Urgence volunteers), Kap Naturel, Le Gaiac, Titè and other volunteers, students, users. ONCFS, ONF, the town hall of Terre de Haut, the National Park of Guadeloupe, the Natural Reserve of St Martin.

This study was funded by:



Photo AEVA