

POPULATION ESTIMATES FOR SEA TURTLES NESTING ON THE ISLAND OF TOBAGO

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Introduction

Three species of sea turtles nest and forage around the island of Tobago in the West Indies; the leatherback (*Dermochelys coriacea*), the hawksbill (*Eretmochelys imbricata*) and the green turtle (*Chelonia mydas*). There are few published data on sea turtles in Tobago. Dow *et al.* (2007) reported that leatherbacks are found nesting all around the island on both the Caribbean and Atlantic side. Most nesting occurs on the Caribbean coastline (Cawley, 2005). This is similar for hawksbills. Some of the beaches are in remote and difficult to reach areas making them difficult to survey. Estimating the total number of sea turtles nesting on Tobago is therefore a challenge.

Information on population size and distribution is key for sea turtle conservation (Hays, 2000). Population size is difficult to determine since sea turtles spend the majority of their life at sea, and only females emerge to nest on beaches every two or three years. Long-term patrolling of beaches with tagging studies is a common method to estimate nesting turtle populations. However, counting tracks and nesting females is very labour intensive, and it is very difficult to get full coverage for a whole area. The resulting data can be difficult to interpret. Population models can fill in missing values for irregular datasets, helping to estimate nesting populations. This is important for long-term studies to enable tracking of population trends through time.

Research Aims

- To estimate the annual nest numbers of the species of sea turtles nesting in Tobago on three regularly patrolled beaches with data from 2005-2010.
- To factor in an additional 11 previously un-monitored beaches for a population estimate for the whole island with data from 2010.

Save Our Sea Turtles (SOS) Tobago is community-based, volunteer organization, formed in 2000 as part of a wider programme to promote the recovery of sea turtles in Tobago. Our mission:

“To conserve Tobago’s sea turtle population and their coastal and marine habitat through research, education and eco-tourism”.
We achieve this through:

- Interactive lectures and field trips within schools and communities.
- Monitoring and data collection on three key nesting beaches in the Courland Bay area; and offshore in the waters surrounding Tobago.
- Encouraging sustainable economic growth by developing a network of turtle friendly communities, tour guides and businesses.
- Working with Local Government and the private sector to adopt turtle friendly measures.
- Working with volunteers, partner organisations, communities, researchers, private and corporate citizens throughout Trinidad and Tobago, the Wider Caribbean and beyond.

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Methods

This research was carried out in collaboration with Save Our Sea-turtles (SOS) Tobago from 2005-2010. The three main nesting beaches on the northwest coast; Turtle Beach, Grafton and Mt. Irvine Back Bay (figure 1), were intensively surveyed during the night for nesting turtles throughout the nesting season (from 1st March till 31st August). There were data available for the majority of the nights, although some data points were missing. The average number of leatherback nests on the three main beaches in Tobago was estimated using a previously developed Poisson cyclical model (Livingstone *et al.* in prep). Data for all species was corrected for false nesting crawls.

In 2010, an additional eleven beaches distributed around the Island (figure 1) were surveyed during the day on a weekly basis for fresh turtle tracks. For 2010, the data were added to the estimate to get a nest estimate for the whole island of Tobago. These beaches were patrolled in the daytime from the 16th of June until the 5th of August; Englishman’s Bay, Parlatuvier, Bloody Bay, Dead Bay, Argyle, Fort Granby, Minister’s Bay, Lambeau, Kilgwyn, Crown Point and Sandy Point. A car was used for transport between the beaches and the patrols occurred once a week. Rainy weather made data collection on these surveys challenging.

There were not enough data on hawksbill turtles to apply the model and data were only available from 2010.

Results and Discussion

Hawksbills and Greens

Data for hawksbill nests were collected on all 14 beaches surveyed. Data were collected for the three main nesting beaches over the whole nesting season (table 1). Data were collected over a shorter time period in the season (July - August) for the other surveyed beaches. Due to the differences in data collection period, these data are not directly comparable. However, this shows that there are hawksbills nesting on almost all beaches of the island and highlights the most important beaches (Back Bay, Englishman’s Bay, Dead Bay and Ministers Bay).



Figure 1. A map of Tobago showing the location of the study sites around the island. The three main nesting beaches are in the northwest side of the island.

It also highlights that the main nesting beaches for leatherbacks and hawksbills are different (see table 3 and 4).

| Beach (main) | Nests |
|--------------|-------|
| Turtle Beach | 7 |
| Grafton | 4 |
| Back Bay | 13 |

Table 1. Number of hawksbill nests recorded between 1st March - 31st Aug 2010

Table 2. Number of hawksbill nests recorded between 16th June - 5th of Aug 2010

| Beach (understudied) | Nests |
|----------------------|-------|
| Englishman’s Bay | 11 |
| Parlatuvier | 0 |
| Bloody Bay | 1 |
| Dead Bay | 8 |
| Argyle | 0 |
| Fort Granby | 1 |
| Ministers Bay | 6 |
| Lambeau | 1 |
| Kilgwyn | 0 |
| Crown Point | 2 |
| Sandy Point | 3 |

A crude calculation of numbers of hawksbill nests in Tobago in 2010 has been calculated to be between **57 and 100 nests**. The number of nests from the understudied beaches should be much higher since data were only collected for a short time in the season.

There were no records of any green turtles nesting in Tobago in 2010. The green turtle has not been recorded nesting on Tobago for several years, since 2008 (G. Lalsingh, pers. Comm., 2010).

Leatherbacks

The estimate for total leatherback nests for the three main patrolled beaches was calculated using the predicted values from the Poisson cyclical model. Table 3 below reports the sum of the predicted values on the three different beaches in all years from 2005-2010.

Turtle beach is the busiest beach for nesting leatherbacks in Tobago. The average annual number of leatherback nests laid on these three main beaches is **359 (± 38) nests**.

The data show that there has been an increase in the numbers of nests laid over the last six years, but this increase is difficult to attribute to an overall population increase. A longer term data-set would be needed to confirm this trend. SOS Tobago will be continuing to collect data into the future.

| Year | Grafton Beach | Back Bay | Turtle Beach | Total |
|------|---------------|----------|--------------|-------|
| 2005 | 48 | 83 | 163 | 294 |
| 2006 | 16 | 19 | 142 | 178 |
| 2007 | 55 | 26 | 147 | 230 |
| 2008 | 127 | 57.3 | 363 | 548 |
| 2009 | 66 | 92.78 | 293 | 453 |
| 2010 | 68 | 110.71 | 270 | 449 |
| | Average | | | 359 |

Table 3. Leatherback nest numbers as estimated from the Poisson cyclical model for each of the three main nesting beaches, with a total number of nests for the three beaches combined.

The data collected from the more remote beaches in Tobago showed interesting results (table 4). This highlights that there are leatherbacks nesting on a number of other beaches in Tobago, although at lower numbers than the three main monitored beaches. Bloody Bay and Dead Bay had the highest numbers. There were very few nestings on the southern coast of the Island. Leatherbacks tend to prefer the beaches on the north coast. The beaches on this coast are much wider offering a larger area of sand to nest on.

| Beach (unstudied) | Nests |
|-------------------|-------|
| Englishman’s Bay | 8 |
| Parlatuvier | 4 |
| Bloody Bay | 18 |
| Dead Bay | 18 |
| Argyle | 0 |
| Fort Granby | 0 |
| Ministers Bay | 4 |
| Lambeau | 0 |
| Kilgwyn | 0 |
| Crown Point | 0 |
| Sandy Point | 0 |
| Total | 52 |

The total nests recorded in 2010 over the shorter time period was **52 nests**. Therefore the total number of nests laid on this collective of beaches is certainly more than recorded here. When these beaches are included, this represents an important portion of leatherbacks nests to the total nests (and therefore nesting adults) for Tobago.

Table 4. Number of leatherback nests recorded between 16th June - 5th of Aug 2010.

Conclusions

The aim of this study was to calculate an estimate of the total annual number of nests of the nesting sea turtle populations in Tobago. There is an important population of hawksbill turtles nesting in Tobago, and the important beaches have been highlighted, due to a regular assessment of the 11 understudied beaches in 2010. These are noted to be different from the most important leatherback beaches. It is recommended that a nesting season long study of these beaches is carried out, to get a better estimate of the numbers of nests that are laid there, for both leatherbacks and hawksbills. This study is labour intensive however, and SOS Tobago does not currently have the resources or manpower to carry out this work.

The leatherback results show that there is an average of approximately 360 leatherbacks nests on the three main beaches in Tobago each year. However, there are at least 50+ (underestimate) additional nests on other beaches in Tobago. More work on these beaches throughout the nesting season would be beneficial. This study shows the applicability of a population model to irregular datasets. Further development of the model is ongoing, and is planned to be published later in 2011. For more information about the methodology of the Poisson cyclical model please email S R Livingstone.

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