Summary of Sea Turtle Nesting Activity 2010

Giancarlo Lalsingh
December 2010

Summary of Sea Turtle Nesting Activity 2010

Giancarlo Lalsingh

December 2010

P.O. Box 27
Scarborough,
Tobago, West Indies
Phone: (868)328-7351
Fax: (868)639-8441
http://www.sos-tobago.org
info@sos-tobago.org
Facebook: SOS Tobago

Abstract

Giancarlo Lalsingh, SOS, 2010. Summary of Sea Turtle Nesting Activity 2010. The sea turtle fauna of Tobago is the most diverse of the twin island state Trinidad & Tobago. Three species, the Leatherback (*Dermochelys coriacea)*; Hawksbill (*Eretmochelys imbricata)*; and Green Turtle (*Chelonia mydas*) have been reported nesting on the island's beaches. Two other species, the Loggerhead (*Caretta caretta)*; and Olive Ridley (*Lepidochelys olivacea*) have been recorded in its coastal waters. Of the 450 nests observed, 426 were Leatherback and 24 were Hawksbill. There were no Green Turtle nests or activity reported in the survey area. In 2010 SOS volunteers alone contributed $20,262.00 USD (or $127,650.00 TTD) directly to the local community adjacent to sea turtle nesting beaches in the survey area, through visitor accommodation. During the period 1st March – 30th September 2010, there were 4,299 persons recorded visiting nesting beaches in the Courland Bay area for the purpose of turtle watching.

Questions and Comments regarding this report, or requests for copies should be addressed to:
Giancarlo Lalsingh or Tanya Clovis
E-mail: info@sos-tobago.org

Front cover photo: Leatherback Hatchling © Giancarlo Lalsingh.
Back cover photo: Leatherback Hatchlings © Giancarlo Lalsingh.

CONTENTS

TABLES & FIGURES

ACKNOWLEDGEMENTS

This report would not have been possible without the data collection efforts, guidance and dedication of SOS volunteers, partner organisations, communities, researchers, and private citizens throughout Trinidad and Tobago, the Wider Caribbean and beyond. We gratefully acknowledge their assistance.

We deeply appreciate and acknowledge the assistance and contributions of:

- The Tobago House of Assembly.
- The High Commission of Canada to the Republic of Trinidad and Tobago.
- Tanya Clovis, President, SOS Tobago.
- The Turtle Village Trust and Partner Communities in Matura, Grande Riviere and Fishing Pond.
- SOS Patrollers, Anson Alfred, Jimmy Ayres, Jezrine Bovell, Cory Lee Qui, Julie Sochan and Darren Thompson.
- Michelle Cazabon-Mannette, Turtle Conservation Officer, Turtle Village Trust.
- SOS Volunteers, Ariel Baptiste, Tikira Berresford, Pippijn Bus, Tabitha De Isle, Owen Hibben and Niamh Vaughn.
- Dr. Karen Eckert, WIDECAST.
- Dr. Julia Horrocks, Barbados Sea Turtle Project/ WIDECAST Regional Tagging Centre, University of the West Indies, Barbados.
- Professor Karen Bjorndal, Archie Carr Center for Sea Turtle Research, University of Florida USA.
- Professor Roger Downie, University of Glasgow, Scotland, UK.
- University of Glasgow 2010 Tobago Expedition, Scotland, UK.
- Rosanna Mooney, MSc. University of Glasgow, Scotland, UK.
- Grant Walker, MSc. University of Glasgow, Scotland, UK.
- Skene Howie.

We also wish to express our sincere thanks to:

- Birdie's Nest Holiday Apartments.
- CEPEP - Back Bay, Grafton Bay and Turtle Beach.
- Duke Robinson's Guest House.
- Fisherfolk and Communities of Black Rock, Pleasant Prospect and Plymouth.
- The Fishpot Restaurant.
- The Kariwak Village Hotel.
- Security and Staff at the REX Turtle Beach Hotel.
- Security and Staff at the Sea Horse Inn.
- Tobago Dive Pirates, Turtle Beach.
- Tobago Tour Guide Association and Tour Guides.
- The Trinidad and Tobago Solid Waste Management Company.

Anyone who has in any way contributed their time, experience and resources to sea turtle patrols and conservation in Trinidad and Tobago. **THANK YOU!**

SUMMARY

- Fourteen sea turtle nesting beaches were monitored from the 1st March – 30th September 2010, covering 747 km of survey effort.
- 491 sea turtle nests were recorded during the period.
- 81 sea turtles were tagged.
- 4299 persons were recorded turtle watching on monitored sea turtle nesting beaches.
- The value of turtle watching and turtle related activities in 2010 are estimated at $76,875.00 USD – $123,000.00 USD ($484,312.00 TTD - $774,900.00 TTD).
- The presence of nesting and offshore foraging turtles increases Tobago's ability to attract visitors and brings added value to the island's tourism product.
- Increase in global environmental awareness is becoming a greater factor for travelers when choosing tourism destinations.
- SOS visiting volunteers contributed over $20,262.00 USD ($127,650.00 TTD) to the local economy.
- Sea turtle nesting beaches provide a valuable opportunity to offer significant income to communities through conservation and eco-tourism related activities.
- Leatherback turtles are the most abundant sea turtle species nesting on beaches surveyed, and currently account for 88% of all known sea turtle activity.
- Nesting of Hawksbill turtles in the survey area is infrequent and only accounts for 12% of all known sea turtle activity.
- Nesting of Green Turtles within the survey area is non-existent.
- Light pollution continues to be an increasing problem on turtle nesting beaches.
- The minimum protective legislation provided by the Government continues to negatively affect the long term survival of sea turtles that nest on beaches or inhabit the waters of Trinidad and Tobago.
- A moratorium should be implemented on the harvesting of ALL species of sea turtles, and in particular Green Turtles and Hawksbills, so that a proper evaluation of their status can be ascertained.
- Continued and accelerated degradation and destruction of nesting habitat through tourism-related activities and beachfront development interferes with the vital process of sea turtle reproduction and can be expected to have serious adverse effects in the short and long term.
- Increased human-related activity on Turtle Beach and Grafton Beach is having a negative effect on the hatching success of sea turtle nests.
- ALL stakeholders need to work much more closely in a spirit of cooperation to achieve the goal of sea turtle conservation, balanced with the sustainable needs of human beings.
- Solutions that work toward safeguarding nesting and foraging habitat, requiring the least amount of manipulation of sea turtles and their natural behaviour, are certain to be the most successful and cost effective in preventing further decline of sea turtle populations and maintaining current nesting distribution.

INTRODUCTION

The sea turtle fauna of Tobago is the most diverse of the twin island state Trinidad & Tobago. Three species, the Leatherback (*Dermochelys coriacea)*; Hawksbill (*Eretmochelys imbricata)*; and Green Turtle (*Chelonia mydas*) have been reported nesting on the island's beaches. Two other species, the Loggerhead (*Caretta caretta)*; and Olive Ridley (*Lepidochelys olivacea*) have been recorded in its coastal waters.

The Leatherback population that nests in the Courland Bay area, (Turtle Beach, Grafton Beach, and Mt. Irvine Back Bay (see appendix) is the largest on the island. From current available data this species alone accounts for 88% of all known sea turtle nesting activity in Tobago.

Hawksbills are the second most numerous turtle, nesting on small isolated beaches scattered around the island. Tobago does support a small offshore foraging population of Green Turtles (Cazabon-Manette, 2010). There are anecdotal reports of Green Turtles nesting on beaches, particularly those located in the northeast of the island (L'Anse Fourmi, Charlotteville and Speyside).

Nesting sites for Hawksbill and Green Turtles are often located on small isolated beaches associated with shallow offshore reefs. This combination of factors makes monitoring of these species on a regular basis difficult.

Sea turtles regularly migrate vast distances between foraging grounds (feeding areas) and nesting beaches. Turtles that nest in Tobago come from widely scattered feeding grounds, many of which are outside the territorial boundaries of Trinidad and Tobago. Satellite tagging of Leatherbacks nesting in Trinidad show that they migrate throughout the tropical and sub-tropical Atlantic before returning to nesting beaches. The migratory patterns of Tobago's (and Trinidad's) nesting Hawksbills and Green Turtles currently remain unknown with the exception of one Hawksbill turtle that was initially recorded and tagged in the Bahamas and subsequently nested in Tobago (Bjorndal, K.A. et al, 2008).

All sea turtles that nest or inhabit the waters of Trinidad and Tobago are protected by the Conservation of Wildlife Act (Chapter 67:01) 1963; and the Fisheries Act (Chapter 67:51) 1975. All species are listed as endangered at a local and regional level with the Leatherback and Hawksbill turtle listed critically endangered worldwide (IUCN).

The Environmental Management Authority (EMA) of Trinidad and Tobago is responsible for co-ordinating Government policy (Shand, 2001) in areas such as natural resource planning, identification of environmentally sensitive species and areas, and the development of the National Environmental Management Plan. Efforts by the EMA to have sea turtles designated as an environmentally sensitive species have so far been unsuccessful.

The minimum protective legislation provided by the Government continues to negatively affect the long term survival of sea turtles that nest or inhabit the waters of Trinidad and Tobago. Illegal hunting (poaching) of gravid females and their eggs, habitat loss and degradation through coastal development, pollution, boating-related accidents, incidental capture in commercial fishing gear, climate change and the continued legal harvest of sea turtles allowed under the Fisheries Act all contribute to the species decline.

These threats to various species and the specific actions necessary for the protection and recovery of sea turtles are described in the Draft National Sea Turtle Recovery Action Plan. However, this plan is yet to be finalized and it recommendation put into action.

As part of a wider programme to promote the recovery of sea turtles in Tobago, Save Our Sea Turtles (SOS) was formed in 2000. Regular beach patrols and a monitoring programme were initiated with a mission to conserve local sea turtle populations, their coastal and marine habitats through community based initiatives in research, education, and eco-tourism.

Data is collected through:

- Nightly patrols and morning surveys of tracks on nesting beaches in the Courland Bay area (Turtle Beach, Grafton Bay and Mt. Irvine Back Bay) from March – September 2010.
- Once weekly day checks on offsite nesting beaches around the island of Tobago from June – August 2010.

Data is compiled by SOS volunteers from nesting and hatching event data sheets, and the results are disseminated through annual reports and publications.

Here we report a summary of activities for the 2010 sea turtle nesting season.

Limitations of data presented in this report include:

1) Heterogeneous data-collection efforts and various levels of surveyor experience.

2) The survey effort does not encompass nesting sites in the northeast of the island. In particularly those located at L'Anse Fourmi, Charlotteville and Speyside. Requests for information regarding nesting at these sites should be directed to the Tobago House of Assembly, Department of Natural Resources and the Environment.

3) The survey effort outside of the Courland Bay area was limited to the period 1st June – 7th August 2010.

Because of these limitations, data collected must be interpreted cautiously and appropriately. Although the information may be useful in evaluating the relative importance of a particular nesting beach (presuming that it is monitored) as a site for sea turtle reproduction, due to the slow sexual maturity of sea turtles, we do not believe the data presented in this report are appropriate to evaluate long-term trends in population.

METHODS

Data were derived principally from:

a) Nightly patrols conducted from the 1st March to the 30th September 2010, between the hours of 8 P.M. to 6 A.M. where observers were present on beaches in the Courland Bay area and actually witnessed nesting activities. Locations surveyed were:

- Turtle Beach
- Grafton Beach (Stonehaven Bay)
- Mt. Irvine Back Bay

b) Evening and morning surveys from June 1st to September 30th 2010, between the hours of 6 P.M. to 8 P.M. and 4 A.M. to 6 A.M. of tracks on beaches that are used as nesting sites by sea turtles. Species identifications and assessment of the nesting success after a turtle has already deposited eggs or gone were usually based on the surveyor's evaluation of features of the track and nest (e.g., track width, track configuration, size of the body pit etc.).

c) Once weekly day checks at eleven off-site nesting beaches from June 1st to August 7th 2010. Species identifications and assessment of the nesting success after a turtle has already deposited eggs or gone were usually based on the surveyor's evaluation of features of the track and nest (e.g., track width, track configuration, size of the body pit etc.). Locations surveyed were:

- Argyle (Carapuse Bay).
- Big Bacolet Bay (Minister's Bay).
- Bloody Bay.
- Crown Point.
- Dead Bay.
- Englishman's Bay.
- Fort Granby.
- Kilgywn Bay.
- Lambeau Beach.
- Parlatuvier.
- Sandy Point.

We believe that errors in species identification do occur occasionally, particularly because of deterioration of the tracks (from weather, pedestrian or vehicular traffic) and surveyor inexperience, but we have no reason to believe that these errors are frequent enough to significantly affect the results of the survey.

Observers also recorded:

- The number of persons (visitors and local residents) visiting nesting beaches for the purpose of turtle watching.
- Disturbance of nesting turtles due to light disorientation or harassment by persons.

Locality names and locations are given in the text and in the appendix. "Survey effort" is defined as the number of kilometers of beach that are regularly monitored for nesting activity for all particular species.

We recognize that the number of kilometers of monitored beach is an imperfect measure of survey effort. However, some measure of survey effort is needed to interpret nesting totals.

Determination of successful nesting can be difficult especially in areas where nest densities are high or in situations where weather has erased the marks left in the sand by the turtle. In the case where a turtle is observed after depositing eggs or a nest is observed on a morning walk, nesting success is estimated and not confirmed but we have no reason to believe that this error would significantly affect the results of the survey.

RESULTS

Survey Area: Turtle Beach, Grafton Beach and Mt. Irvine Back Bay.

NESTING & ACTIVITY

The total number of sea turtle activity (all events) for all species are reported in table 1.

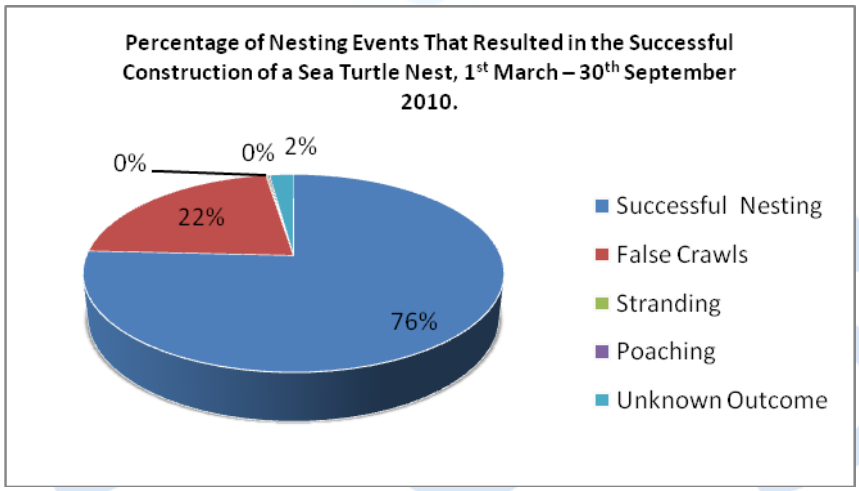
Table 1. Total Number of Sea Turtle Events Recorded and Beach Lengths Surveyed in Courland Bay Area, 1st March – 30th September 2010.

Month	Back Bay	Grafton	Turtle Beach	Total	Survey Effort (Km) Per Night	Survey Effort (Km) Per Month
March	3	2	12	17	3.2Km	99.2 Km
April	21	14	50	85	3.2Km	96 Km
May	38	24	83	145	3.2Km	99.2 Km
June	43	51	115	209	3.2Km	96 Km
July	32	32	58	122	3.2Km	99.2 Km
August	8	2	6	16	3.2Km	99.2 Km
September	0	0	0	0	3.2Km	96 Km
Total	**145**	**125**	**324**	**594**	**-**	**684.8 Km**

The survey effort for all three species was 3.2 kilometers per night, with a total survey effort of 684.8 kilometers for the period 1st March – 30th September 2010. The month of June had the highest number of activity with 209 events recorded.

Of the 594 events recorded (all species), 450 of these (or 76%) resulted in the successful construction of a nest in the survey area; 129 (or 22%) resulted in a false crawl; 1 (= 0%) stranding; 1(= 0%) poaching of a non-nesting juvenile; and 13 (2%) unknown outcomes (Figure 1.).

Fig. 1.



The total number of sea turtle nests for all species in the surveyed area, are reported in table 2.

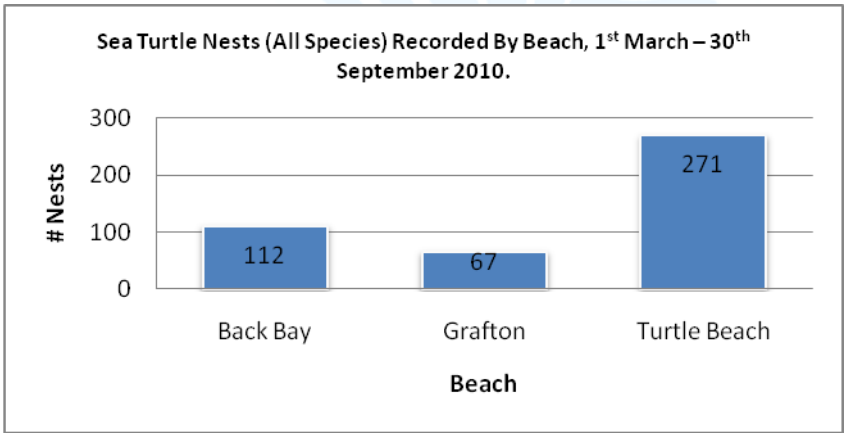
Table 2. Total Number of Reported Sea Turtle Nests Observed in the Courland Bay Area, 1st March – 30th September 2010.

Month	Leatherback	Hawksbill	Green	Total
March	16	0	0	16
April	62	0	0	62
May	111	0	0	111
June	157	7	0	164
July	78	8	0	86
August	2	9	0	11
September	0	0	0	0
Total	**426**	**24**	**0**	**450**

Of the 450 nests observed, 426 were Leatherback and 24 were Hawksbill. There were no Green Turtle nests or activity reported in the survey area.

Of the 450 nests constructed, there were 271 nests (60%) recorded on Turtle Beach; 112 nests (25%) recorded on Mt. Irvine Back Bay; and 67 nests (15%) recorded on Grafton Bay (Figure 2).

Fig. 2.



The month of June had the highest number of nests constructed with 164 nests recorded for all three beaches in the survey area (Figures 3, 4 & 5).

Fig. 3.

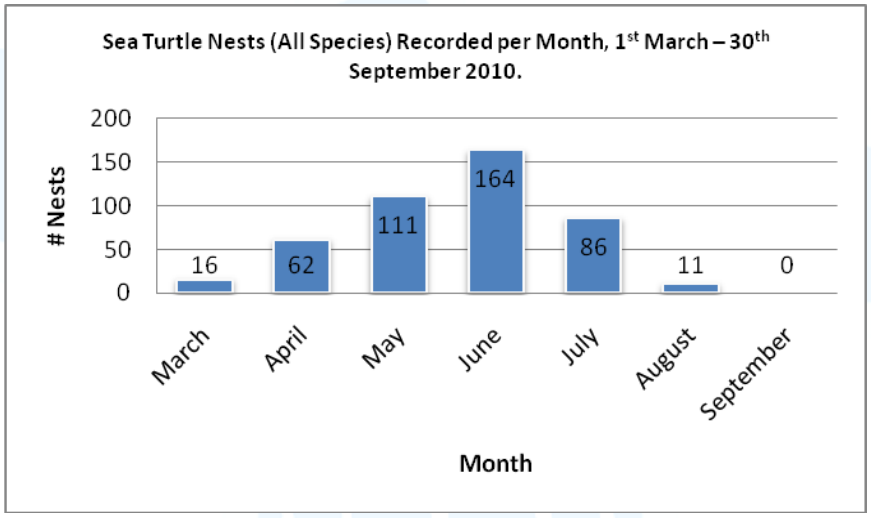


Fig. 4.

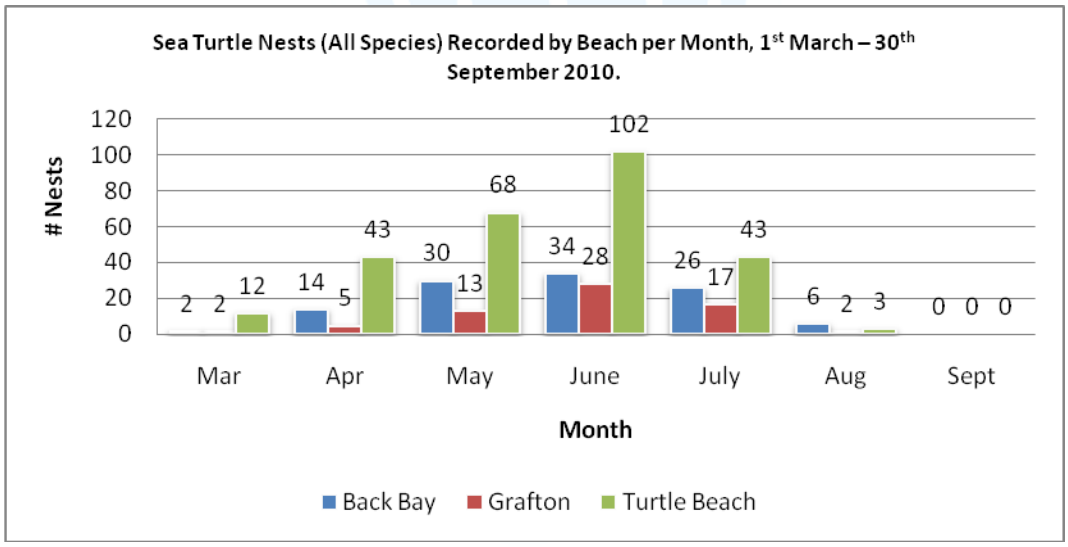
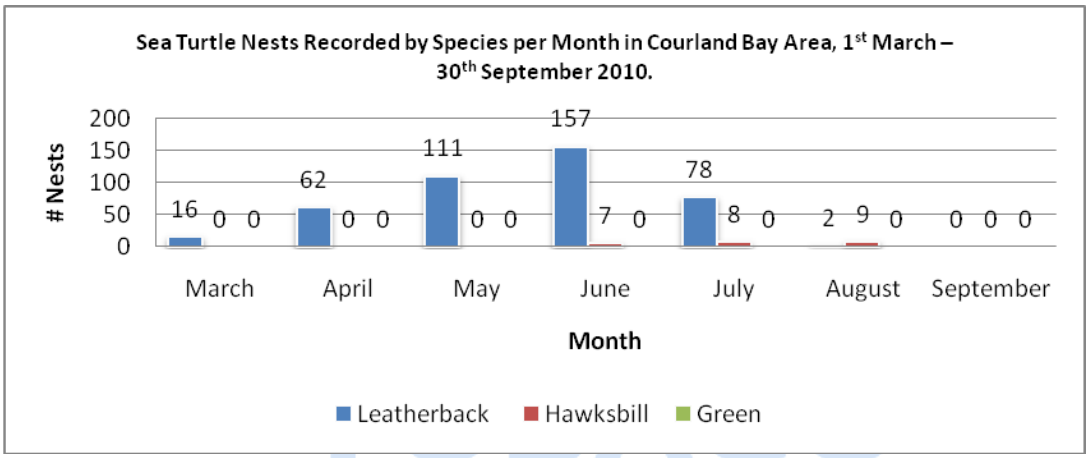


Fig. 5.



TAGGING

75 Leatherback turtles and 5 Hawksbills turtles in the survey area and 1 Hawksbill outside the survey area were tagged and recorded as 'New', having no flipper or P.I.T. tags present (Table 3). There were no Green Turtles recorded.

Table 3. Number of Reported Sea Turtles Tagged in the Courland Bay Area, 1ST March – 30ST September 2010.

Month	*Dermochelys coriacea*	*Eretmochelys imbricata*	*Chelonia mydas*	Total
March	2	0	0	2
April	15	0	0	15
May	11	0	0	11
June	36	2	0	38
July	11	3	0	14
Aug	0	0	0	0
September	0	1*	0	1*
Total	**75**	**6**	**0**	**81**

N.B. **Turtle was tagged outside the survey area.*

69 Leatherback turtles were recorded as 'Returns', already having flipper or P.I.T. tags present from previous years and/or other nesting beaches outside the survey area. There were no Hawksbill or Green Turtles recorded as 'Returns' (Table 4).

Table 4. Number of Reported Sea Turtle Recorded as 'Returns' in the Courland Bay Area, 1st March – 30th September 2010.

Month	*Dermochelys coriacea*	*Eretmochelys imbricata*	*Chelonia mydas*	*Total*
March	4	0	0	4
April	20	0	0	20
May	15	0	0	15
June	23	0	0	23
July	7	0	0	7
Aug	0	0	0	0
September	0	0	0	0
Total	**69**	**0**	**0**	**69**

Leatherbacks show less breeding philopatry or site fidelity to nesting beaches than other sea turtles and often use many beaches within a region to nest (Law et al, 2009). Several turtles marked as 'Returns' in 2010 were previously tagged while nesting on beaches located on other Caribbean islands and South America (Figure 6). These include:

- La Plaine Beach[1], Dominica W.I.
- Levera Beach[1], Grenada W.I.
- Matura Beach[2], Grande Riviere[2] and Fishing Pond[2], Trinidad W.I.
- Cipara Beach[1], Querepare Beach[1] and Margarita Island[3], Venezuela.

Fig. 6. Map Showing Movement of Leatherback Turtles Between Nesting Sites in Tobago (Courland Bay), Trinidad, Eastern Caribbean and Venezuela.

N.B. Tracks do not represent actual path taken by turtles. Map © Google Earth 2010.

Information provided is courtesy of:

1. The WIDECAST Regional Tagging Centre, University of the West Indies Barbados.
2. Turtle Village Trust, Trinidad and Tobago.
3. The Archie Carr Center for Sea Turtle Research, University of Florida USA.

Survey Area: Argyle, Big Bacolet Bay, Bloody Bay, Crown Point, Dead Bay, Englishman's Bay, Fort Granby, Kilgywn Bay, Lambeau Bay, Parlatuvier, Sandy Point.

NESTING & ACTIVITY

The total number of sea turtle activity (all events) for all species are reported in table 5.

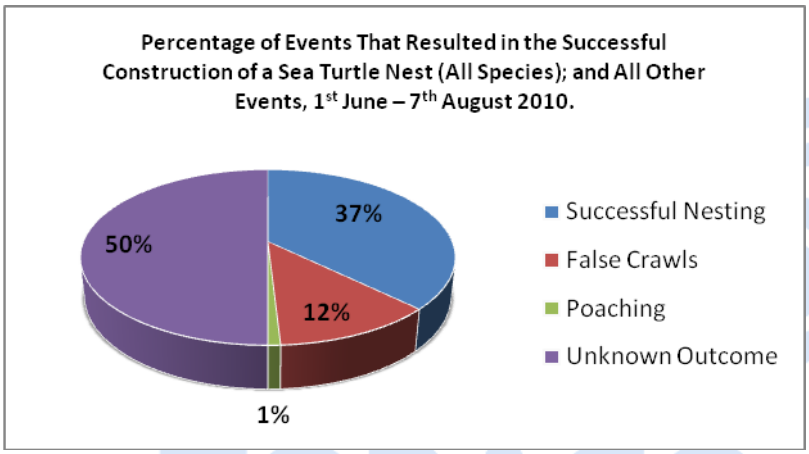
Table 5. Total Number Of Sea Turtle Events and Beach Lengths Recorded in the Wider Survey Area, 1st June – 7th August 2010.

Beach	June	July	August	Survey Effort (Km)Per Week	Total Survey Effort (Km) Per Beach
Englishman's Bay	17	8	0	0.35	3.5
Parlatuvier	3	2	0	0.24	2.4
Dead Bay	27	4	0	0.2	2.0
Bloody Bay	20	5	0	0.31	3.1
Argyle	0	0	0	1.0	10
Ft. Granby	0	1	0	0.65	6.5
Big Bacolet Bay	10	2	4	1.3	13
Lambeau	0	0	1	1.5	15
Kilgwyn	0	0	0	0.2	2.0
Crown Pt.	3	0	0	0.32	3.2
Sandy Pt.	3	0	0	0.15	1.5
Total	**83**	**22**	**5**	**6.22**	**62.2**

The survey effort for all three species was 6.22 kilometers per week, with a total survey effort of 62.2 kilometers for the period 1st June – 7th August 2010. The month of June had the highest number of activity with 83 events recorded.

Of the 110 events recorded, 41 of these (37%) resulted in the successful construction of a nest in the survey area; 13 (12%) resulted in a false crawl; 1(< 1%) poaching of a nesting female; and 55 events (50%) were recorded as unknown outcome (Figure 6).

Fig. 7.



The total number of sea turtle nests for all species in survey area, are reported in table 6.

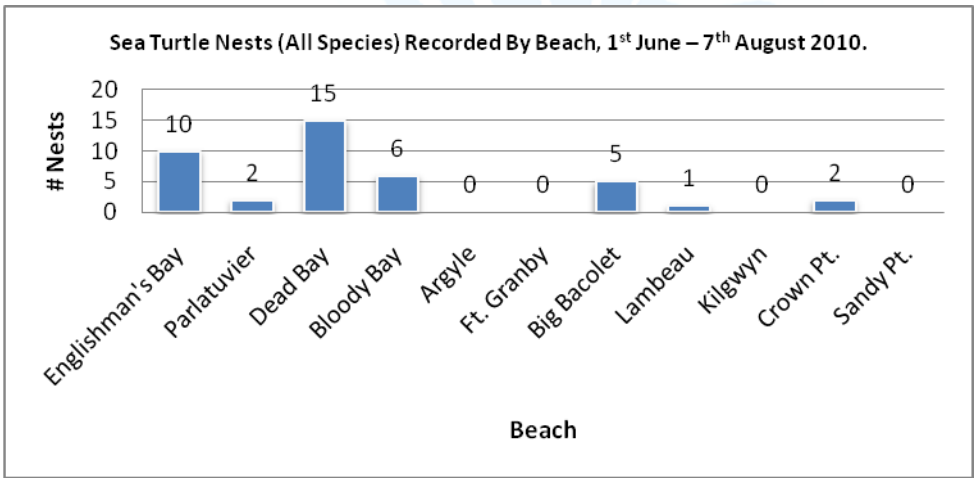
Table 6. Total Number of Reported Sea Turtle Nests Observed in the Wider Survey Area, 1st June – 7th August 2010.

Month	Leatherback	Hawksbill	Green	Total
June	23	15	0	38
July	0	1	0	1
August	0	2	0	2
Total	23	18	0	41

Of the 41 nests observed, 23 were Leatherback and 18 were Hawksbill. There were no Green Turtle nests or activity reported in the survey area.

Of the 41 nests observed, there were 15 nests (37%) recorded at Dead Bay; 10 nests (24%) recorded at Englishman's Bay; 6 nests (15%) recorded at Bloody Bay. 5 nests (12%) recorded for Big Bacolet. 2 nests recorded at Parlatuvier (5%) and Crown Point respectively (5%); 1 nest (2%) recorded at Lambeau. There were no nests recorded at Argyle, Fort Granby, Kilgwyn and Sandy Point (Figure 8).

Fig. 8.



The month of June had the highest number of nests observed with 38 recorded for beaches in the surveyed area (Figures 9 & 10).

Fig. 9.

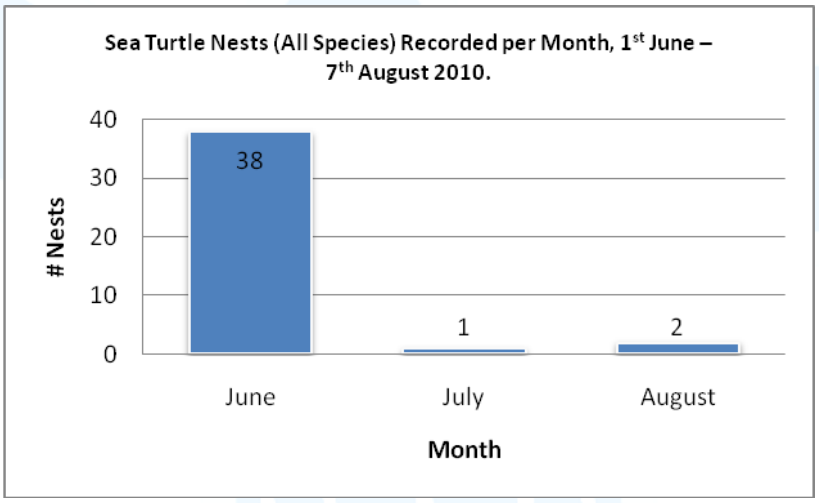
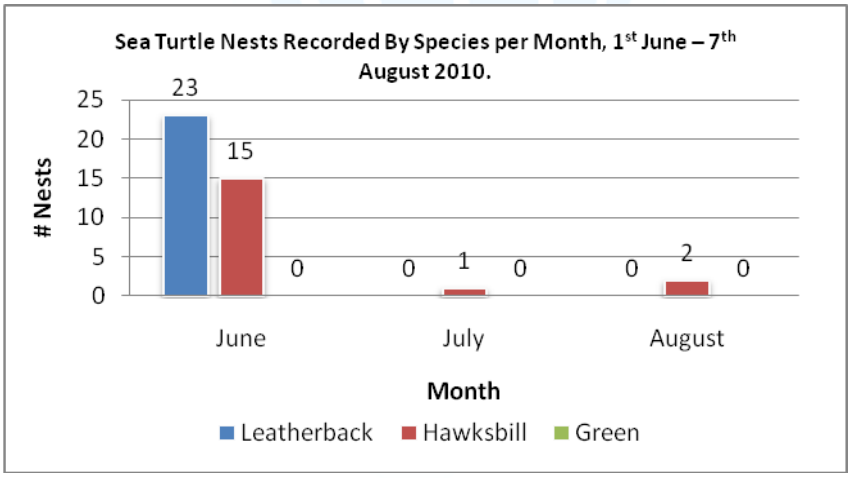


Fig. 10.



TAGGING

There were no sea turtles tagged in the surveyed area or during the survey period.

DISCUSSION

SPECIES REPRESENTATION

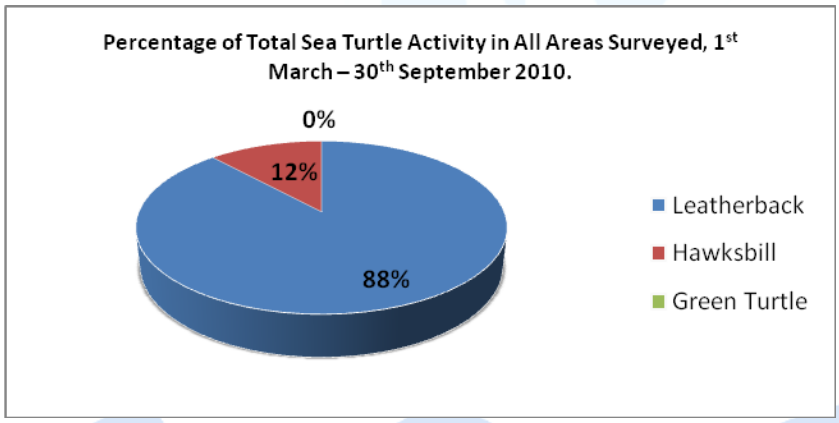
The Leatherback Turtle *(Dermochelys coriacea)*
IUCN Red List Status: Critically Endangered.
Global Population Trend: Decreasing

The main procedure for evaluating the status of the Leatherback Turtle, as well as other sea turtle species, is through surveys of activity at nesting beaches. The decline in global nesting has been documented to be much greater than 80%, particularly in the Pacific Ocean and analysis of published estimates of global population sizes suggest a reduction of over 70%. In other areas of its range, the observed declines are not as severe, with some populations showing trends towards increasing or stable nesting activity (IUCN/ Martinez, 2000).

In the Atlantic Ocean, the information available demonstrates that the largest nesting population is in French Guyana but the trends there are unclear. While some of the Caribbean's nesting populations appear to be increasing or at the very least stable, however their sizes are very small when compared to those that nested on the Pacific coasts less than 10 years ago (IUCN/ Martinez, 2000).

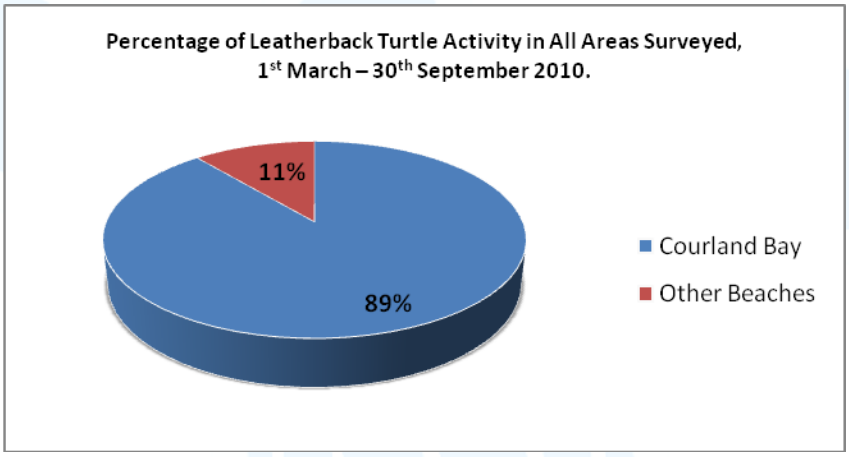
Leatherback turtles are the most numerous sea turtle species nesting in Tobago. Activity for this species accounts for 88% of all known sea turtle nesting activity that occurred during the 2010 nesting season on beaches surveyed (Figure 11).

Fig. 11.



The Courland Bay area alone accounted for 553 events (89%) of all known recorded Leatherback nesting activity, with the remaining 69 events (11%) of nesting related activity scattered throughout the remaining surveyed beaches (Figure 12).

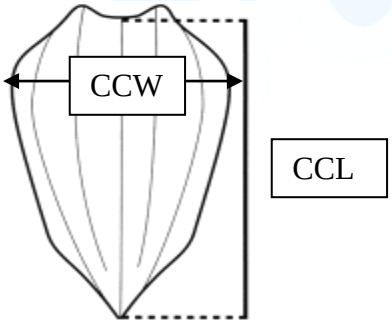
Fig. 12.



The minimum curved carapace width or (CCW) for Leatherbacks recorded was 98 cm and the maximum was 134cm, with a mean average of 116cm (Figure 13).

The minimum curved carapace length or (CCL) for Leatherbacks recorded was 143cm and the maximum was 173cm, with a mean average of 141.5cm (Figure 13).

Fig. 13. Curved Carapace Width and Curved Carapace Length Measurements in Leatherback Turtles.



The Hawksbill Turtle *(Eretmochelys imbricata)*
IUCN Red List Status: Critically Endangered.
Global Population Trend: Decreasing

Historic and recent published and unpublished accounts indicate extensive subpopulation declines in all major ocean basins as a result of over-exploitation of adult females and eggs at nesting beaches, degradation of nesting habitats, take of juveniles and adults in foraging areas, incidental mortality relating to marine fisheries, and degradation of marine habitats (IUCN/ Mortimer & Donnelly, 2008).

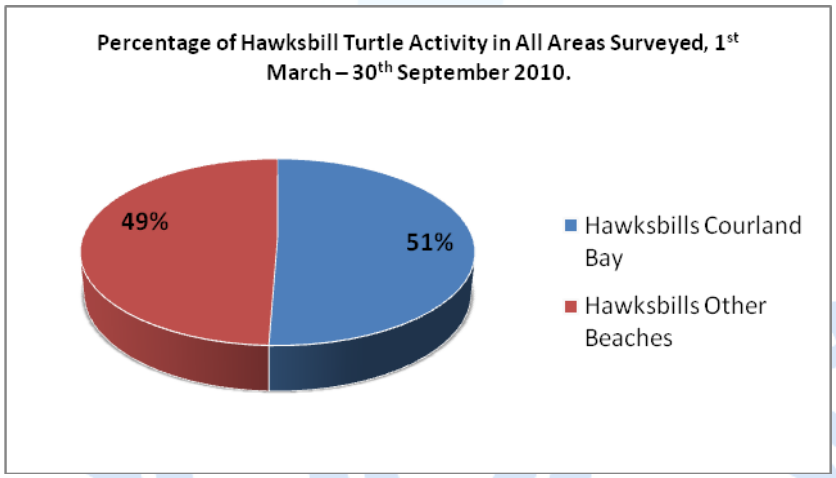
Under the "Protection of Sea Turtles and Turtle Eggs Regulations" of the Republic of Trinidad and Tobago Fisheries Act 1975, ALL species of sea turtles can be legally hunted in the waters surrounding Trinidad Tobago from October – February annually, despite their local, regional and global status as endangered or critically endangered.

Hawksbills are the second most targeted and caught species, after the Green Turtle, during this period. While the Law does state where and when sea turtles can be caught, it is not regularly enforced, if at all, and does not place any specific limits on the size or numbers of turtles caught, nor is there any census taken on the number of turtles caught annually.

Nesting activity by Hawksbills in the survey area is not frequent. Activity for this species accounts for just 12% of all sea turtle nesting activity that occurred during the 2010 nesting season on surveyed beaches (Figure 11).

The Courland Bay area accounted for 42 events (51%) of all nesting activity for Hawksbill turtles, with the remaining 41 events (49%) of nesting related activity were scattered throughout the remaining surveyed beaches (Figure 14).

Fig. 14.



It is important to note that deficiencies in the surveillance of this species do occur. Surveys usually comprise track counts rather than actual encounters with turtles on nesting beaches and the survey did not include reported nesting sites at L'Anse Fourmi, Charlotteville and Speyside.

Data recorded in 2007 showed 53 nesting events in these areas by Hawksbills, with 21 of these either being confirmed or estimated nests. This suggests that these areas may be the species nesting stronghold on the island of Tobago.

Errors in species identification do occur occasionally, particularly because of deterioration of the tracks (from weather, pedestrian or vehicular traffic) and surveyor inexperience, but we have no reason to believe that these errors are frequent enough to significantly affect the results of the survey.

However, considering the large area covered by the survey (14 nesting beaches) it is alarming that the total recorded Hawksbill nesting activity for 2010 occupied such a small percentage of all sea turtle events in the survey area and by extension the rest of Tobago.

This small overall percentage suggests a possible rapid decline in the number of Hawksbill turtles nesting on Tobago's beaches.

Hawksbill populations continue to decline in many parts of the world. The IUCN Red List Standards and Petitions Subcommittee in 2001 upheld the Critically Endangered listing of the Hawksbill, based on ongoing and long-term global population declines in excess of 80% along with ongoing exploitation (IUCN/ Mortimer & Donnelly, 2008). This species lives in near-shore coastal habitats making them particularly vulnerable to exploitation such as poaching and overharvesting.

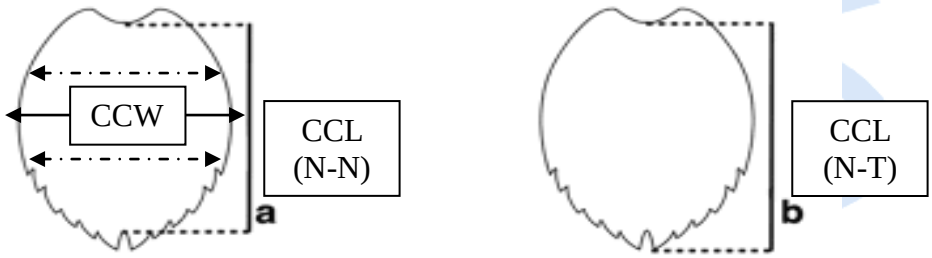
Unlike previous reviews of the status of the Hawksbill, the present IUCN assessment is quantitative and provides a numerical basis for the global listing of the species as Critically Endangered (IUCN/ Mortimer & Donnelly, 2008).

The minimum curved carapace width (CCW) for Hawksbills recorded was 67cm and the maximum was 85cm, with a mean average of 76cm (Figure 15).

The minimum curved carapace length (CCL) notch to notch (N-N) for Hawksbills recorded, was 70 cm and the maximum was 95, with a mean average of 82.5cm (Figure 15).

The minimum curved carapace length (CCL) notch to tip (N-T) for Hawksbills recorded, was 71cm and the maximum was 96 with a mean average of 83.5cm (Figure 15).

Fig. 15. Curved Carapace Width and Curved Carapace Length Measurements in Hawksbill and Green Turtles.



The Green Turtle *(Chelonia mydas)*
IUCN Red List Status: Endangered.
Global Population Trend: Decreasing

Historic and recent published accounts indicate extensive subpopulation declines of Green Turtles in all major ocean basins as a result of overexploitation of eggs and adult females at nesting beaches, juveniles and adults in foraging areas, and, to a lesser extent, incidental mortality relating to marine fisheries and degradation of marine and nesting habitats. Because many of the threats that have led to these declines are not reversible and have not yet ceased, it is evident that Green Turtles face a measurable risk of extinction. (IUCN/ Seminoff, 2004).

Prior to 1975, hunting of sea turtles was implicitly prohibited by the Conservation of Wild Life Act, which did not include turtle hunting in the hunting schedule(s), and therefore implied year-round protection of sea turtles.

Since the implementation of the "Protection of Sea Turtles and Turtle Eggs Regulations" of the Republic of Trinidad and Tobago Fisheries Act 1975, ALL species of sea turtles can be legally hunted in the waters surround Trinidad Tobago from October – February, despite sea turtles local, regional and global status as endangered or critically endangered (IUCN).

Green Turtles are the species most regularly targeted and caught during this period. Turtles may not be captured on land, and females may not be captured within 1000 yards from the high water mark or anywhere on the reef. Collection of eggs for consumption and sale are explicitly prohibited at all times of the year.

However, these restrictions cannot be imposed due to insufficient enforcement capacity, and the difficulty of identifying the sex of immature turtles (Burke et al, 2008). It also does not place any specific limits on the size or numbers of turtles caught, nor is there any census taken on the number of turtles caught annually.

Trinidad and Tobago is a party to the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) of the Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, which entered into force in 2000.

Article 11 (1) (b) of SPAW prohibits "the taking, possession or killing…or commercial trade in [endangered] species, their eggs, parts or products." Article 14 does provide an exemption "to meet traditional subsistence and cultural needs of its local populations... [without causing] the extinction of, or a substantial risk to, or substantial reduction in the number of…threatened, endangered or endemic species."

It would thus appear that the Fisheries Act relies on Article 14 to avoid violation of SPAW (Burke et al, 2008).

The continued legal harvest along with incidences of regular poaching on nesting beaches means that the extent to which Green Turtles nested historically in Tobago remains unclear. Reports of nesting today are anecdotal at best and there is no current data available to support sporadic nesting of this species on beaches throughout Tobago.

The last known available report of Green Turtle nesting activity by SOS was in 2007 on L'Anse Fourmi beach, where a single track was observed but not the actual animal. Although Green

Turtle tracks differ from Hawksbill tracks, due to their similar size and use of the same nesting beaches they may not always be correctly identified by surveyors, with many instances of nesting Hawksbills and their tracks being misidentified for Green Turtles (Personal observation).

Data collected suggests that even if there still remains a small sub-population of nesting Green Turtles in Tobago, it has declined to such levels that their numbers would be too low to support a viable nesting population and will be become locally extinct in the very near future.

There was no nesting activity recorded for the Green Turtle on beaches surveyed, even at sites adjacent to known identified offshore foraging areas at Kilgwyn, Cove and Mt. Irvine. Offshore studies of Green Turtles observed, captured and tagged at these sites were juveniles and sub-adults with a straight carapace length under 100cm (Cazabon-Manette, 2010).

During the decades prior to adulthood, juveniles move long distances between areas of developmental habitat and on reaching sexual maturity return to their natal beach to nest (Lagueux, 2001). This could explain these regular sightings of Green Turtles in offshore areas of Tobago yet no observed nesting activity.

This is of concern as Green Sea Turtles observed foraging in Tobago are juveniles that have not matured, and have yet to move on to their natal nesting sites throughout the Caribbean and Latin America. This means that the continued legal harvest taking place in the waters surrounding Trinidad and Tobago will continue to have an adverse negative effect on the nesting populations of Green Turtles in other countries or territories.

SOS along with other local conservation groups in Trinidad and Tobago have suggested that a moratorium be placed on the harvesting of ALL species of sea turtles, and in particular Green Turtles and Hawksbills, so that a proper evaluation of their status can be ascertained.

TOURISM & TURTLE WATCHING

Tourism is an important and growing economic sector in Tobago, contributing approximately 46 percent of the island's GDP in 2005 (Burke et al, 2008).

Eco-tourism represents one of the fastest growing segments in this sector and is receiving more official attention, capitalizing on the country's rich biodiversity. This is evident by numerous images depicting scenes of natural settings and biodiversity (including sea turtles) in various marketing tools used by both the Tourism Development Company and Tobago House of Assembly's Department of Tourism.

In an exit survey conducted in 2003, 40% of visitors found Eco-tourism to be a significant factor in influencing their decision to visit Tobago (Burke et al, 2008).

The most visible local community activity in the tourism process in Trinidad and Tobago is the protection of sea turtles and nesting beaches (Shand, 2001).

NGOs and Communities play a critical role in advocating eco-tourism. For example, SOS patrols and protects turtles and their nesting beaches and lobbies for the conservation of sea turtles and their coastal and marine habitats as a basis for sustainable eco-tourism in Tobago.

Organisations like Environment Tobago perform the role of environmental watchdog over tourism development projects, while The Buccoo Reef Trust and Speyside Eco-park Marine Rangers are NGOs with a special interest in the conservation of coral reefs and the marine environment.

Tours to view the large, charismatic Leatherback turtles are common during the peak of the nesting season (May-July). Tourists and residents visit the beach at night to watch a 1000-pound female haul herself up the beach, dig a large nest, lay over 100 eggs, and finally find the energy to cover the nest and return to sea.

As many as 100 tourists per night, typically pay USD$ 25-40 per tour, although the price can be much higher (Personal observation; Burke et al, 2008; Troëng and Drews, 2004).

Although tourists do not pay specifically to view sea turtles during diving and snorkeling trips, seeing turtles surely adds value in the form of consumer surplus (Burke et al, 2008.) Current research being conducted at the University of the West Indies (Cazabon-Mannette/ UWI) is focused on divers' willingness to pay to see sea turtles, and seeks to infer the added value from seeing one or more turtles during a dive or snorkel trip.

Burke et al (2008) states:

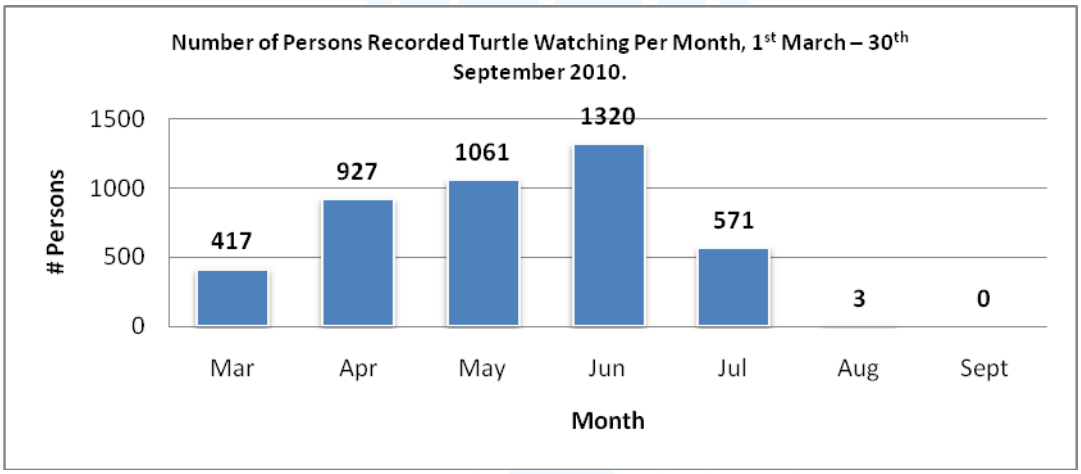
"If turtle viewing is common and is advertised, trip fees could be increased to capture this added value - which, with an estimated 10,000 divers and over 170,000 snorkel trips in Tobago (in 2006), could prove to be significant."

During the period 1st March – 30th September 2010, there were 4,299 persons recorded visiting nesting beaches in the Courland Bay area for the purpose of turtle watching. Of this, 3,075 were tourists or non-resident visitors and 1,224 were resident visitors. When compared to the number of total visitors in 2009 (4,644), this represents a drop of 7%.

However when the number of non-resident visitors in 2009 (3,147) are compared to those in 2010 (3,075), where the bulk of tourism-related income is derived, the drop in visitors is negligible (<2%). The presence of nesting and foraging turtles increases Tobago's ability to attract visitors and brings added value to the many hotels, villa properties, and associated businesses, and demonstrates that turtle watching remains a highly valuable asset to Tobago as it seeks to position itself as the tourism destination of choice in the wider Caribbean.

The month of June saw the highest number of visitors with 1,320 persons recorded (figure 16).

Fig. 16.



Turtle Beach had the highest number of visitors recorded for the period 1st March – 30th September (Figure 16), with a total 3,823 persons. This represents 89% of all visitors participating in turtle watching, and related activities.

Fig. 17.

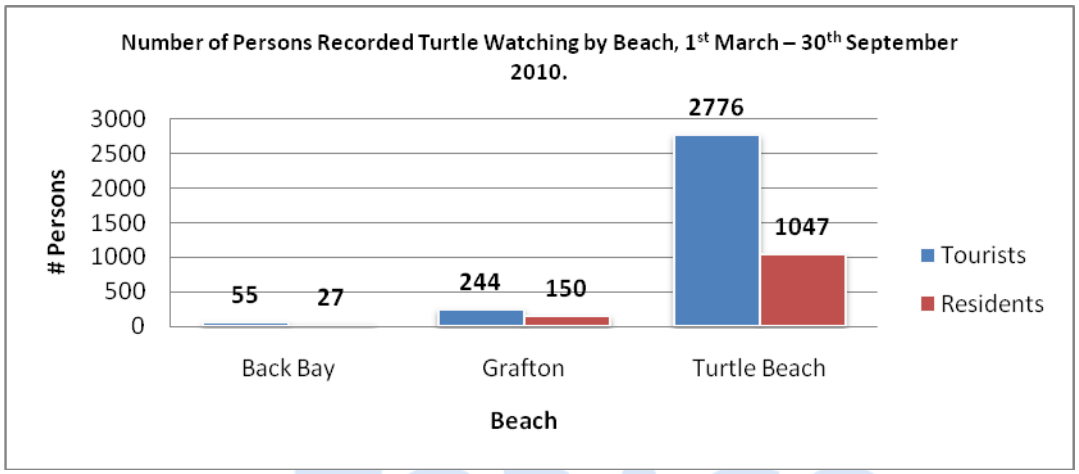


Photo: Visitors take part in a sea turtle hatchling release. Turtle Beach, Tobago. © G. Lalsingh.

Turtle watching continues to be a popular activity among resident and foreign visitors alike, and provides significant financial benefit to tour operators and tour guides who offer turtle watching tours. Tours offered to non-resident visitors range in price from **$25.00 US Dollars to $40.00 US Dollars per person**. These tours operate at low cost, so most of the revenue is profit, providing important and valuable income to tour operators and guides as it comes during the relatively slow tourist season of May-October (Burke et al, 2008).

Based on the number of non-resident visitors recorded turtle watching (3,075), this represents an estimated value ranging from **$76,875.00 USD – $123,000.00 US Dollars (**or equivalent to **$484,312.00 TTD - $774,900.00 TTD,** at an exchange rate of 6.3 TTD: 1 USD) in potential revenue from turtle watching on beaches that form part of the SOS nesting beach monitoring programme.

Many of these visitors also utilize accommodation, craft, entertainment, food, taxis, car rental, and other services from local communities, hotels, villas, and guest houses adjacent to turtle nesting beaches, and throughout Tobago.

In 2010 SOS volunteers contributed **$20,262.00 USD (**or **$127,650.00 TTD)** directly to the local community adjacent to sea turtle nesting beaches in the survey area, through visitor accommodation alone. This figure does not include their additional contribution through use of local services (taxis, tours, shops, food and beverage etc).

Sea turtles have the potential to contribute positively to satisfying human needs in localities where they have not thus far been linked to community development (Montoya & Drews, 2006). Villages such as Castara, Charlotteville, Parlatuvier and Speyside could benefit from sea turtles as community-managed visitor attractions in conjunction with a monitoring programme.

Photo: SOS Volunteers participate in a coastal clean-up. Lambeau Beach, Tobago © G. Lalsingh.

Visitor feedback is much more positive when they feel that they have witnessed or been a part of an actual conservation effort rather than a mere ‘tour’ with many people signing up to ‘adopt a turtle’ so as to be kept abreast of local conservation efforts even after they return home (Personal observation)

In Tobago, sea turtles are the object of both consumptive (hunting) and non-consumptive (viewing) human use. Each type of use generates revenue in the local economy, but the two types have differing implications for future turtle populations, and therefore future use.

A compilation of studies on consumptive and non-consumptive use of sea turtles in developing countries suggests that revenues from tourism (turtle watching, diving, snorkeling etc.) are usually much higher than revenue from consumption, and that the benefits have a wider distribution (Burke et al, 2008).

Troëng and Drews (2004) also state:

"Non-consumptive use of sea turtles has been shown to generate more revenue (versus consumptive use), has greater economic multiplying effects, greater potential for economic growth, creates more support for natural resource management, and generates social development and employment opportunities, particularly for women in communities."

Therefore, the true direct and indirect economic benefit derived from turtle watching and forms of non-consumptive use in Tobago is undoubtedly an underestimate and far greater than any socio-economic benefit derived from the harvest and sale of turtle meat.

Although the harvest of sea turtles for consumption has been a long standing tradition in Tobago, this practice puts additional pressure on an endangered species population.

Despite the many benefits sea turtles as a natural living resource contribute to the livelihoods of the people, communities and economy of Tobago (and Trinidad), there continues to be little support or commitment of resources on the part of Government for sea turtle conservation initiatives, promotion of responsible turtle watching practices and to enforce or update laws that protect sea turtles and their coastal and marine habitats.

BEACHFRONT LIGHTING

Sea turtles use natural light at night to guide them back to the sea after nesting and are seriously affected by artificial lights (Horrocks et al, 2002), which are brighter than natural light cues.

These lights cause disorientation of nesting females, leading them to spend extended periods of time navigating the beach before returning to the sea. Artificial lights also seriously affect the ability of hatchlings to orient and navigate towards the sea.

With regard to hatchlings ability to orient and then navigate towards the sea, Horrocks, J.A. (2002) states:

"Without intervention, their fate is to die in the heat of the next day's sun, to be crushed by vehicles on roads they have attempted to cross, or to be attacked and killed by crabs, cats, dogs and other predators. Despite best efforts at mitigation, even when we manage to get hatchlings safely into the sea, we know that hatchling viability has become compromised."

In recent years, coastal areas near nesting beaches have become more developed and recently crime has also escalated in many of these areas. The built environment has changed significantly and the effect of the ever increasing level of lighting has become a concern.

Light disturbance of nesting sea turtles was monitored in the Courland Bay area (Turtle Beach, Grafton Beach and Mt. Irvine Back Bay). Overall 13% of nesting sea turtles and 30% of all successfully hatched nests in this survey area were disoriented by lights (figures 18 & 19).

Fig. 18.

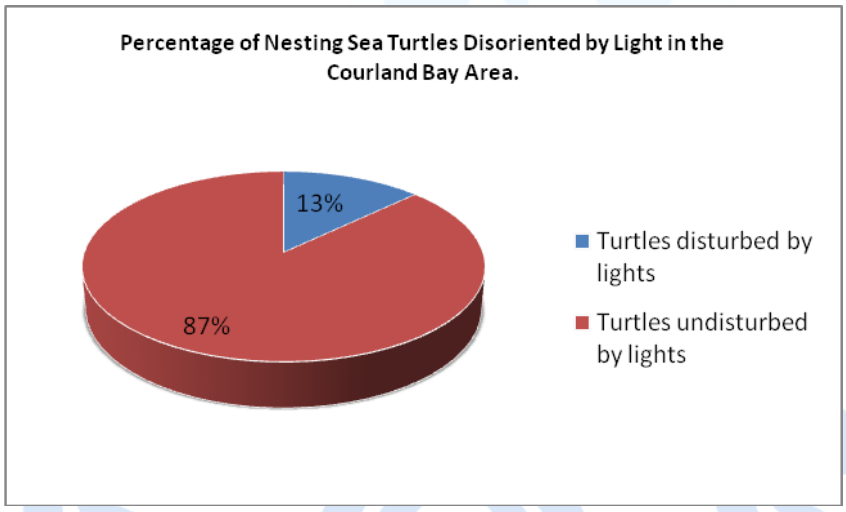
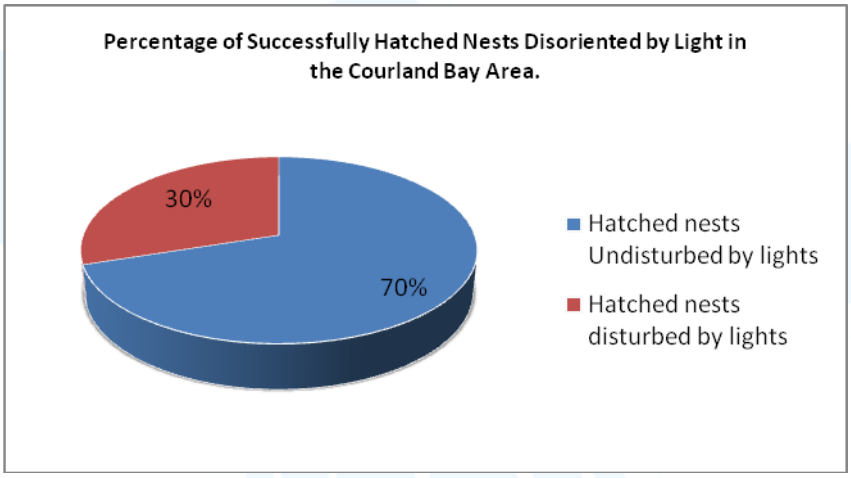


Fig. 19.



However when the data is looked at by a beach by beach basis we see that Grafton Beach has highest incidence on light disturbance and disorientation when compared to Turtle Beach and Back Bay (Figures 20-23). This is mainly caused by the installation of street lights along the entire length of Stonehaven Bay Road in 2008.

23% of all nesting females and 50% of all hatched nests are disoriented by lights on Grafton Beach, compared to Turtle Beach where only 15 % of all nesting turtles and 23% of all hatched nests are disoriented by light. There are no incidences of light disturbance on Mt. Irvine Back Bay as presently it remains in a relatively undeveloped natural state.

Fig. 20.

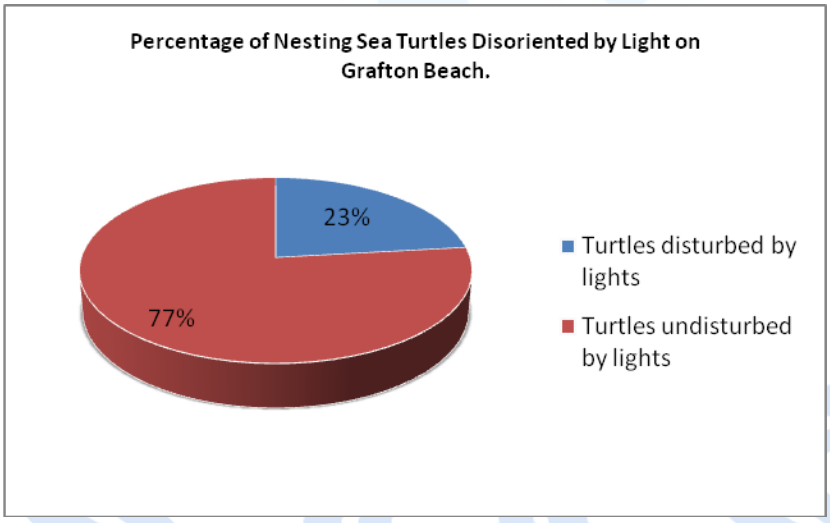


Fig. 21.

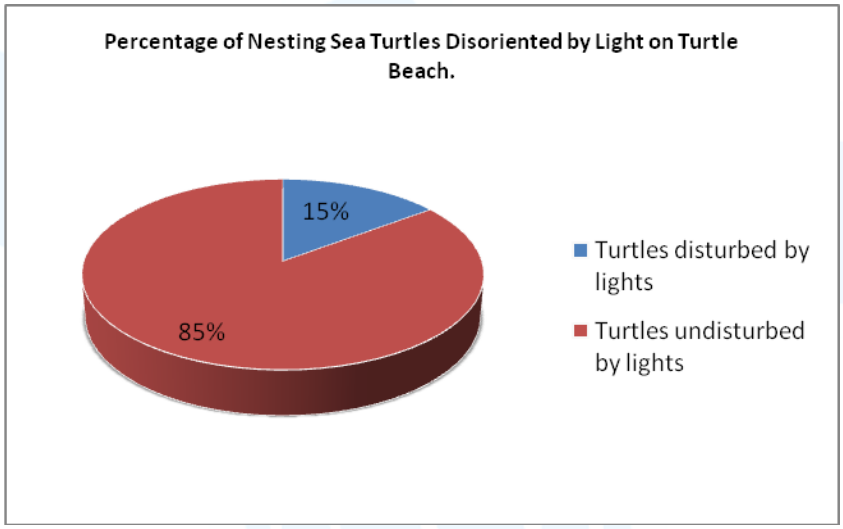


Fig. 22.

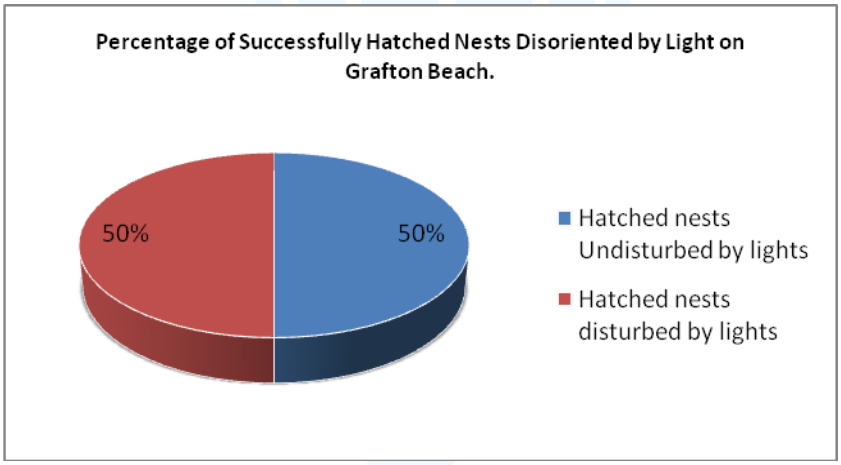
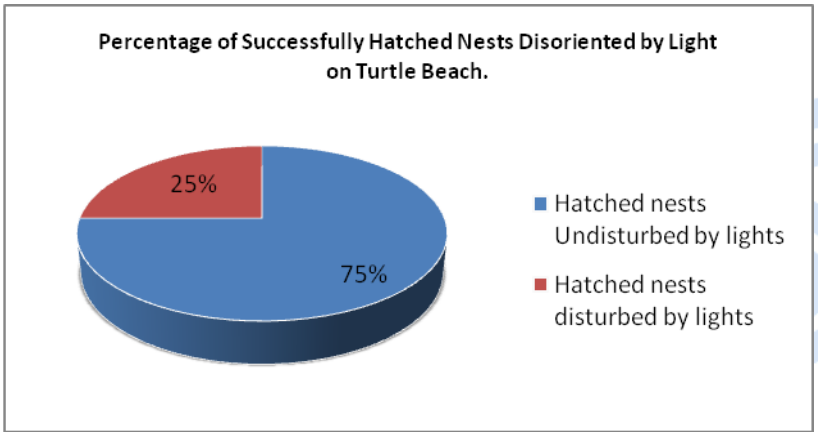


Fig. 23.



While these lights are meant to address the issue of security for hotel and villa properties and pedestrians in the area, there is no need to compromise human safety for sea turtle conservation efforts.

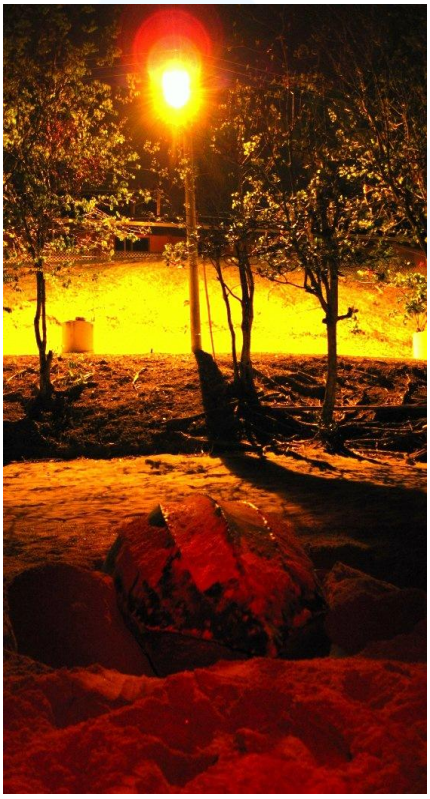


Photo: A leatherback Turtle nests in front of a streetlight. Grafton Beach, Tobago. © G. Lalsingh

The key to light management is not to prohibit light but manage it. Light management is the process of getting light where it is needed most and keeping light away from areas where it can do harm (Witherington et al 2000).

.

There are currently no laws that address the issue of beach front lighting in areas near to sea turtle nesting beaches in Trinidad and Tobago and the issue is left either at the discretion of various private property holders and local or municipal corporations in charge of public lighting.

Beachfront lighting issues that continue to cause disorientation at Grafton and Turtle Beach are:

- Street lighting, Stonehaven Bay Road.
- Fisheries depot, Turtle Beach.
- Beachfront lighting, Turtle Beach.
- Basketball court lighting, Plymouth.

In the absence of national legislation and regional or municipal regulations, SOS recommends that the following guidelines, in conjunction with properties owners and Government sanctioned natural resource agencies, be implemented on both Grafton and Turtle Beach during the sea turtle nesting season from March - September:

Turn off unnecessary beach lighting – this includes non essential lighting or decorative lighting that illuminates areas where there are no people or goods in need of safety.

Time use of lights – while permanent alterations to lighting are most effective, temporary seasonal alterations can also be effective, particularly during peak nesting and hatching periods (May – August).

Limit light duration – the shorter the time the light is on the smaller the effect on sea turtles (e.g. use of motion detectors).

Use good light control – this involves controlling the direction of light, allowing property owners to increase the brightness of their properties without affecting the nesting beach.

Use light screens – sometimes it is difficult to remedy light at the source. One way to lessen this is use of screens, either artificial (use of structures at / near the light source) or natural (decorative vegetation, landscaping along the beach itself).

Substitute light sources – even the best light-control techniques may allow some light to reach the beach. It may be beneficial to use light sources that emit wavelengths that least affect sea turtles.

Most species of sea turtles are least affected by red lights. Substituting light sources should also be done in conjunction with good light management as all sources of light can be harmful to sea turtles.

MANAGEMENT OF SEA TURTLE NESTING BEACHES

It is clear that the continued and accelerated degradation and destruction of nesting habitat through recreational activities and beachfront development interferes with the vital process of sea turtle reproduction and can be expected to have serious adverse effects. These will only be further exacerbated by climate change and the associated issues of sea level rise and global warming.

Sea turtles must return to the land to lay their eggs, and many contemporary threats are associated with physical development and recreational activities on or near nesting beaches (Choi & Eckert, 2009).

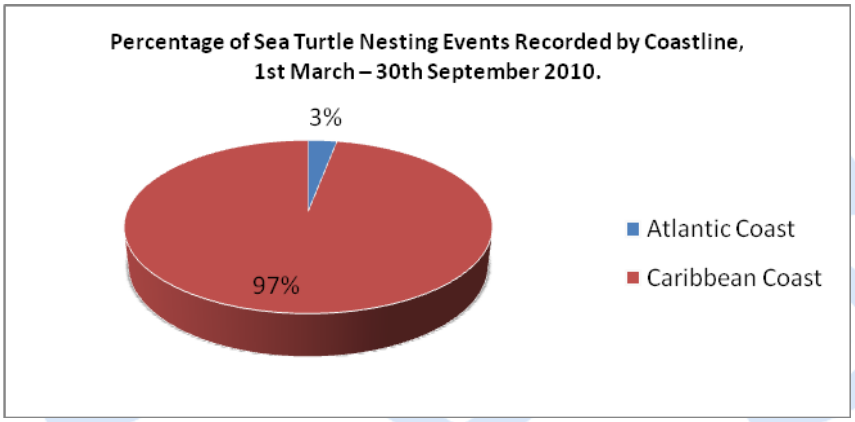
The argument that turtles prevented from nesting in one location will simply go elsewhere to nest fails to provide a long term answer to the problem of shrinking habitat, and it ignores the fact that nesting site fidelity is a well documented behaviour of sea turtles.

Perhaps the most pervasive problem in the Courland Bay area at this time is artificial lighting, as already mentioned in this report and this is closely tied to the larger issue of coastal development, This also includes but is not limited to coastal armouring (sea walls etc.), removal of beach sand (sand mining), obstructions - such as physical objects left on the beach at night, beach driving, recreational activities and large events held on the beach.

Added to this is the fact that in some cases, turtles are already subject to harassment and interference by hundreds of over-curious onlookers every night (Personal observation). All these factors significantly impact the viability of the nesting beaches in the Courland Bay area and throughout Tobago.

All or a combination of these problems are most noticeable on beaches along the Caribbean coastline of Tobago where 97% of known reported sea turtle nesting activity takes place (Figure 24) and particularly in the Courland Bay area where on 84% of all known sea turtle activity takes place.

Fig. 24.



Both Turtle Beach and Grafton Beach are heavily developed with permanent tourism related properties and infrastructure directly adjacent to these nesting beaches, including large hotels, villa properties, beach bars and coastal roads. Many of which were built prior to the implementation of SOS patrols and beach monitoring programme in 2000.

In many instances, development on beaches often creates unnatural cycles of erosion, through placement of permanent structures, removal of native vegetation (Choi & Eckert, 2009) and improper drainage (Personal observation) reducing potential nesting habitat and destruction of existing incubating nests.

Mt. Irvine Back Bay is currently accessible only to pedestrian traffic and due to its undeveloped and secluded nature does not suffer these same impacts.

The chronic removal of beach sand scars the terrain, accelerates erosion, and degrades or destroys stabilizing beach vegetation by extraction or saltwater inundation (Choi & Eckert, 2009).

Sand mining still occurs regularly on Turtle Beach, particularly in the area of the Black Rock Heritage Park. Persons that participate in this illegal activity, take advantage of the direct vehicular access to secluded areas of the beach through the Park at night and on weekends, when there is no recourse available to report these activities to the relevant authorities.

This activity if continued unchecked can lead to loss of vital beach habitats. The loss of sandy beaches not only reduces the reproductive success of sea turtles, but endangers beachfront property and has serious economic implications for locally vital industries such as fishing and tourism (Choi & Eckert, 2009).

Obstructions, such as physical objects left on the beach at night (e.g., beach chairs, umbrellas, boats, fishing nets) can prevent sea turtles from finding suitable nesting habitat and fatally hinder hatchlings from finding their way to the sea. SOS works with the management of the Rex Turtle Beach Hotel to ensure that all beach furniture and water sports equipment is removed nightly from the beach during the nesting season, so as to not hinder the nesting of female turtles or cause entrapment of hatchlings.

Beach driving in recent times has become a serious problem on both Grafton and Turtle Beach. This activity can crush incubating eggs and hatchlings and tire ruts trap hatchlings as they crawl across the beach to the sea. It also creates an unsafe environment for visitors and other persons using the beach for recreation.

Properly managed moderate recreational use of nesting beaches during daylight hours probably does not pose any real problems to nesting turtles, incubating nests and hatchlings. However, large public events on Turtle Beach and to a lesser degree Grafton Beach seriously undermines the efforts of SOS to effectively conserve protect and ensure the overall safety of nesting turtles, incubating nests and hatchlings.

Of urgent concern is the increased use of the Black Rock Heritage Park for large scale public events, particularly during peak turtle nesting and hatching months (April – August).

Since 2006, SOS has had to continuously mitigate the damage to the nesting beach adjacent to the Black Rock Heritage Park, caused by the annual Tobago Heritage Festival which coincides

with the start of peak hatching season. The organizers of this event do seek guidance from SOS on use of the beach and surrounding area, however during the actual event itself, there seems to be little or no control over the activities of persons participating in the event. This negates all efforts to prevent damage to the beach and particularly incubating nests and hatchlings waiting to emerge.

In 2010 the annual Rainbow Cup Triathlon was moved from Grafton Beach to Turtle Beach at the Black Rock Heritage Park. Although Grafton Beach is a nesting site for critically endangered sea turtles, the previous triathlon site was held in an area of very low nesting density and damage to the area minimal. However the area of beach directly adjacent to the Black Rock Heritage Park has a high density of sea turtle nests.

Organizers of this event were given approval for use of the Black Rock Heritage Park adjacent to the nesting beach, without any prior consultation with SOS or the surrounding community. SOS was again forced to put measures in place to mitigate damage to the nesting beach. Although the organizers of the triathlon were supportive of these measures and did show a high degree of control over the activities of participants and the general public during the course of their event, SOS is of the opinion that such events should be held at more suitable locations.

Such areas in Tobago are available and include Canoe Bay, Store Bay, The Scarborough Esplanade and the Pigeon Point Heritage Park, which not only have permanent facilities and access to amenities needed for hosting such events available year round but are much better suited and equipped to do so.

The Courland Bay area is the site of 84% of all known sea turtle nesting activity and if we do not address these issues of beach-use and coastal development, community conservation efforts will be undermined and recovery of these critically endangered species hindered.

Harassment of nesting turtles and hatchlings on Turtle Beach and other nesting beaches continues to be a problem but thankfully it is on the decline. Over-eager tourists and other visitors to the nesting beaches are not always aware of appropriate turtle watching behaviour resulting in turtles being unnecessarily and inadvertently disturbed by noise, lights and camera flashes, abandoning nesting and retreating to the safety of the sea.

Similarly, hatchlings emerging from a nest at night are prevented from getting into the sea by beach hustlers who collect them and then charge tourists a small fee so that they can take pictures or touch turtles. While these hatchlings are later released, their chances of survival have already been compromised as they have had to use up finite energy stores, instead of using it in their swim out to sea (Horrocks, et al, 2002.).

The SOS Patrol and Volunteer presence on nesting beaches along with our continued education and awareness efforts with visitors, tour guides and hotels keeps such activity to a minimum but greater support is needed from either Government Agencies or Law Enforcement officers.

Beach driving has in recent times become a popular activity on Turtle Beach and Grafton Beach and coincides with the summer vacation and influx of visitors from Trinidad.

Choi, et al (2009) states:

"That driving on beaches can seriously degrade the coastal environment by damaging beach vegetation, compacting sand, crushing incubating eggs, creating deep ruts and tire tracks that can trap hatchlings trying to reach the sea, and accelerating erosion (potentially resulting in the loss of nests to the sea). Vehicles can also strike and kill hatchlings crawling to the sea, or frighten females away from nesting. Hatchlings huddled just below the surface of the sand (waiting to emerge later in the evening, when the sun sets and the beach surface cools) are particularly vulnerable to being crushed by passing vehicles."

SOS has made numerous reports to the relevant authorities concerning this environmentally damaging practice, however by the time a report is made the damage to the nesting beach has already been done to incubating nests and hatchlings.

All of the activities mentioned above have had a detrimental effect on the successful incubation and hatching of sea turtle nests in the Courland Bay area.

On Turtle Beach only 72 of the 271 nests constructed in 2010 hatched. This represents only 27% of all nests successfully constructed on this beach.

Grafton Beach saw a similarly low percentage of nests hatch (27%) with only 18 of the 67 nests constructed successfully hatching.

When compared to Mt. Irvine Back Bay, we see a reversal of this trend where 55% or 62 nests out of 112 nests constructed successfully hatched. This is probably due to a combination of limited beach access and its continued undeveloped natural state.

This trend is of urgent concern as Turtle Beach and the rest of the Courland Bay area represents the largest known nesting population of Leatherback turtles in Tobago but also 84% of ALL known sea turtle nesting activity on the island.

SOS has worked hard to reduce the illegal killing of severely depleted turtle populations for meat, eggs, and shells; however we are now faced with the challenge of reducing the accidental destruction of incubating nests and killing of hatchlings that occurs as a consequence of poor beach management and its associated activities.

Hatchlings are the breeding adults of the future. If sea turtle nests are impacted negatively on a continuing basis resulting in the loss of nests and hatchlings, it will lead to an overall decrease in the number of nesting turtles and their eventual extinction in Tobago.

Designating the most active nesting beaches as prohibited areas would help solve many of these problems. However that solution may not be feasible as these sites are already heavily developed and are used by many tourism (hotels, villas properties) and community stakeholders (fisherman, tour guides, and general public).

In terms of policy and strategy for sustainable use, SOS sees one its core roles as advocacy for policies that are mutually beneficial to sea turtles, the environment, communities and private sector stakeholders.

While best practices and guidelines to minimize impacts on sea turtles, and the coastal and marine environment are well documented and available to ALL stakeholders, there is currently no mechanism in place to enforce compliance.

SOS recommends that the following guidelines, in collaboration with ALL stakeholders be implemented in the Courland Bay area during the sea turtle nesting season from March - September:

- Update of guidelines and/or legislation with regard to beachfront development in coastal areas, and in particular as it relates to sea turtle nesting beaches.

- Mt. Irvine Back Bay be left in its current undeveloped state and be designated a prohibited area (entry by permit only) during hours of night (7 p.m.-5a.m.) during the nesting season March – September.

- Halt of all large outdoor public events on the most critical or sensitive turtle nesting beaches, in particular Turtle Beach, during the nesting season or during peak nesting and hatching months (April – September), and that suitable facilities be provided for the hosting of these events in particular those that relate to Community, Culture and Sporting events.

- Government Agencies in charge on natural resource management and Tourism collaborate with Law Enforcement Agencies to ensure and enforce the necessary measures to mitigate damage to nesting beaches (and the environment) that may be caused by large outdoor public events.

- Smaller recreational activities, such as small gatherings (<50 persons) and weddings be limited to daylight or early evening hours (no later than 7 pm) on nesting beaches or at least during peak nesting and hatching months, so as to not disturb nesting and hatchling turtles.

- Enforcement of Anti-Litter Laws along with the placement of sufficient garbage bins and regular collection of garbage on ALL beaches and coastal areas used recreationally by the public.

- ALL stakeholders, private and community ensure the removal of obstructions and or equipment (beach chairs, waters ports equipment, fishing nets) from nesting beaches at night during the nesting season.

- A public ban on driving on ALL beaches in Trinidad and Tobago and block vehicular access points to beaches – with the exception of essential services (debris clearing, flood alleviation, ambulance, and armed services).

- Agencies charged with marketing Trinidad and Tobago as a tourism destination should not only highlight the natural wonders of our country but also include and supply information on environmental best practices and guidelines to potential tour operators and visitors before they arrive.

- Certification of Tour Operators and Tour Guides updated to include guidelines on how to conduct Turtles Tours that do not disturb nesting turtles or hatchling turtles, instead of this just being an optional “add-on” to the basic training.

- Tour Operators and Tour Guides should provide the necessary information to their guests and visitors about how to behave on nesting beaches.

POACHING

SOS was first formed in 2000 to address the rampant poaching activity that took place in the Courland Bay area.

The presence of a regular beach patrol, together with ongoing education and awareness campaigns over the last ten years has dramatically reduced the incidence of poaching that was once evident on Turtle Beach, Grafton Beach and Mt. Irvine Back Bay.

In 2010 there were no reports of poaching of nesting turtles in the Courland Bay area. However there is evidence that poaching still continues on other beaches surveyed and those outside the survey area with Leatherback carcasses reported by the public at Goldsborough and Lambeau beaches. Turtles foraging in the offshore waters also continue to be the target of spear-fisherman, even though it is illegal to catch, kill or harvest sea turtles during the nesting season (March – September).

Photo: Hawksbill Turtle killed by spear-fisherman. Grafton Beach, Tobago. © G. Lalsingh.

One Hawksbill was found on Grafton Beach after being shot through its head with a spear gun, dismembered and its remains discarded in the rocks at the end of the beach, and a Green Turtle was found washed up dead on Lambeau Beach. Evidence suggests it was shot by a spear fisherman, but escaped, only to later succumb to it injuries.

On Englishman's Bay there was evidence of a nesting Hawksbill turtle dragged off the beach and then removed to an unknown location where it was probably killed. This was corroborated by beach vendors who reported persons regularly coming on the beach at night to poach nesting females and eggs.

Photo: Green Turtle killed by spear-fisherman. Lambeau Beach, Tobago. © G. Lalsingh.

Reports also continue to come out from beaches in northeast Tobago (L'Anse Fourmi, Charlotteville, and Speyside) from both residents and visitors, who observe and report dead or decaying carcasses found on beaches.

While this practice undermines the efforts of local conservation groups and the overall survival of sea turtles nesting in Tobago, these illegal and gruesome activities also severely challenge Tobago's image as a tourism destination that promotes itself as "Clean, Green, Safe and Serene."

In addition to the issue of illegal poaching on the beaches during the nesting season, the continued unchecked slaughter of numerous Green and Hawksbill turtles in nets during the open season also continues to do significant damage to sea turtles and Tobago's equally fragile image as an eco-destination.

Burke et al (2008) states:

"Although the current harvest is not in violation of national law, better enforcement of the law is needed to curb the poaching of turtles during the nesting season and any harvest of nesting females. Furthermore, given the significant economic benefits for non-consumptive use, and the likely declining sea turtle population, perhaps it is in the best interest of the local economy of Trinidad and Tobago to reconsider its legal harvest season for these internationally endangered species."

Word of mouth and visitor feedback from sites such as Trip Advisor play an increasingly important role in the decision making process for eco-savvy travelers in today's interconnected world. With an ever growing global environmental consciousness, travelers are choosing to go to destinations that promote environmental stewardship and sustainable management of natural resources over those destinations that continue to promote environmentally damaging activities.

CONCLUSION

Despite the best efforts of SOS and its partners over the last ten years, sea turtle conservation continues to remain an issue of minimum national importance despite the many positive social, economic and ecological benefits that sea turtles provide to local communities and the economy of Tobago.

Not only is there a greater need for awareness of these benefits among the general public and private sector but also for Government Agencies who hold the overall responsibility for ensuring the sustainable management of our limited natural resources.

We need to move from a culture where our natural resources are used in a manner that impacts the environment negatively while benefiting a few select elements within our society, to one that promotes good stewardship, positive benefits for our communities and environment, and equity for ALL.

Action to address legal loopholes that promote unsustainable activities and social inequity that not only affect Trinidad and Tobago's sea turtle populations, and human communities, but the wider Caribbean need to be undertaken as a matter of urgent importance.

ALL stakeholders need to work much more closely in a spirit of cooperation to achieve the goal of sea turtle conservation, balanced with the sustainable needs of human beings in recognition of the fact that any steps taken to safeguard our natural environment for the benefit of sea turtles will also benefit us all in the long run.

Government and the Private Sector both need to lend support (financial and otherwise) for community conservation efforts, particularly where their activities result in positive returns for ALL stakeholders.

Many challenges lay ahead to ensure the long term survival of sea turtles in Tobago. Numerous factors continue to affect turtles at all stages of their life-history, but effectively ensuring the protection turtles and their nesting habitat is within our reach.

Solutions that require the least amount of manipulation of turtles and their natural behaviour are certain to be the most successful and, in many cases, the most cost effective.

APPENDICES

TURTLE WATCHING GUIDELINES

1. Use of flashlights should be kept to a minimum, and only used when necessary, as these can scare off turtles emerging from the water and disorient nesting females and hatchlings.

2. As soon as a turtle has been sighted, quietly and slowly retreat to a distance of 15m (45 feet).

3. Be sure to stay behind the turtle at all times.

4. When a turtle has stopped digging, the SOS patrol, game warden, hotel security or trained guide will determine if the laying process has begun by approaching the turtle from behind.

5. During the laying process, SOS patrollers, game warden, hotel security or trained guide may record size, tag and observe the well being of turtle, and occasionally, if the situation permits, allow small groups of people to observe the laying process.

6. Groups should consist of no more than 10 persons at a time.

7. Flashlights should preferably be equipped with a red photographic filter or red L.E.D. bulbs and only be used to highlight the laying process. Never shine a flashlight at or on a turtle's head.

8. Flash photography is not permitted at anytime during the nesting process.

9. Be very careful where you walk when hatchlings are around - they are difficult to see at night and can be easily crushed.

10. If hatchlings are found, never place directly into the sea as this interferes with their natural imprinting process.

11. Never drive or use heavy equipment on nesting beaches as these may crush nests or prevent hatchlings from digging their way to the surface through nest compaction.

12. Remove any obstructions (sand castles, beach chairs, nets etc.) on the beach as these can prevent turtles from nesting and hatchlings from reaching the sea.

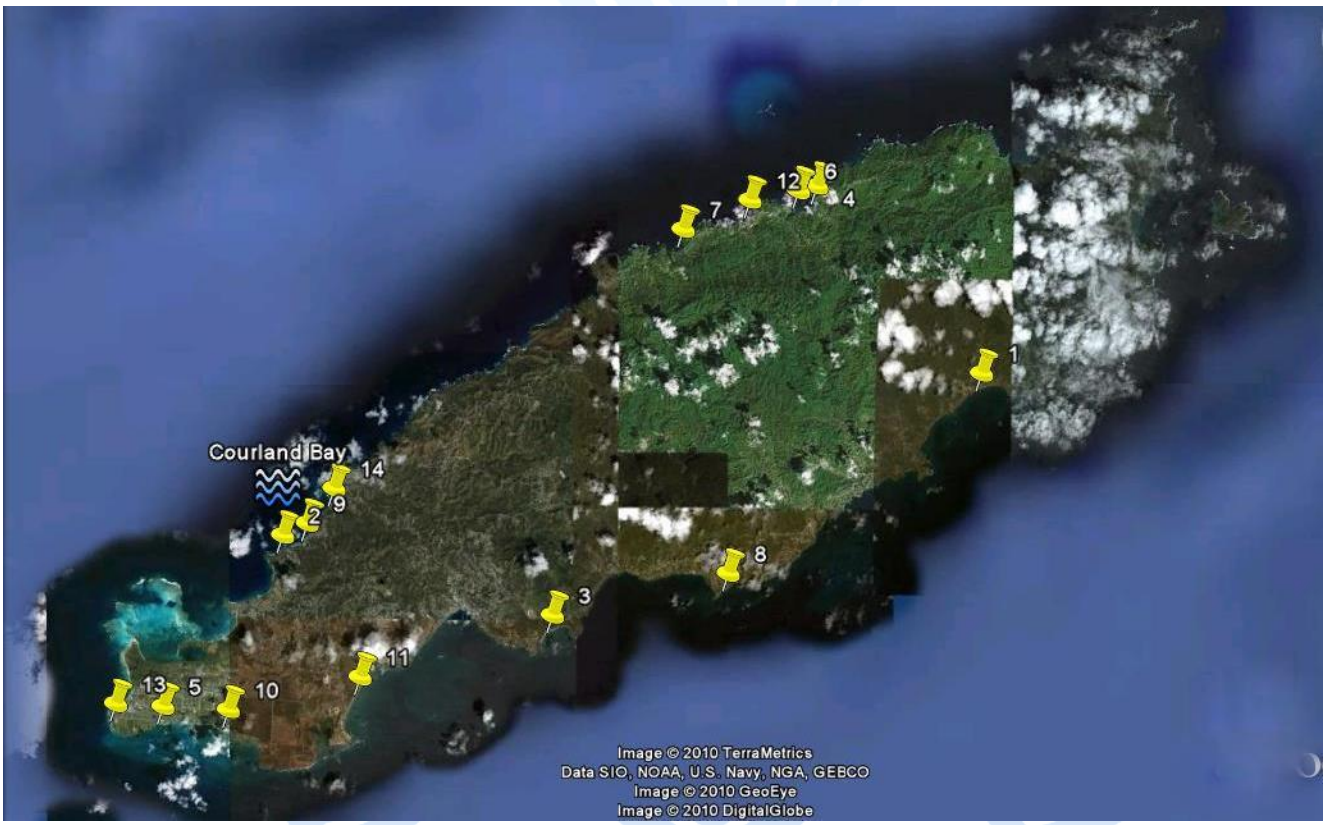
For full details of turtle watching guidelines or what to do in an emergency, please refer to the Sea Turtle Manual for Nesting Beach Hotels, Staff, Security and Tour Guides (Clovis, T. 2005) or contact SOS for a copy.

BEACHES MONITORED

#	Beach Name	Locality/ Village	Coastline	Length (Km)
1	Argyle	Roxborough	Atlantic	1.0
2	Back Bay	Mt. Irvine	Caribbean	0.64
3	Big Bacolet Bay	Scarborough/Bacolet	Atlantic	1.3
4	Bloody Bay	Bloody Bay	Caribbean	0.31
5	Crown Point	Crown Point	Atlantic	0.32
6	Dead Bay	Bloody Bay	Caribbean	0.2
7	Englishman's Bay	Castara	Caribbean	0.35
8	Ft. Granby	Studley Park	Atlantic	0.65
9	Grafton Beach	Black Rock/ Pleasant Prospect	Caribbean	0.8
10	Kilgwyn	Kilgwyn/ Friendship	Atlantic	0.2
11	Lambeau	Lambeau	Atlantic	1.5
12	Parlatuvier	Parlatuvier	Caribbean	0.24
13	Sandy Point	Crown Point	Caribbean	0.15
14	Turtle Beach	Black Rock/ Plymouth	Caribbean	1.76

N.B. See map below for approximate locations

Map Showing Location of Beaches Surveyed. © Google Earth 2010



Map Showing Location of Nesting Beaches Surveyed and Adjacent Communities in the Courland Bay Area. © Google Earth 2010

SOS NESTING EVENT DATA SHEET (Please print in BLOCK LETTERS)

Female See by Patrol (circle one) YES NO

Date _____ Time Seen _____ Time Out _____

Species (circle one) LBK HWK GRN Other species (please specify) _____

Location (circle one) TB GR BB Other beach (please specify) _____

Zone (circle one) 1 2 3 4 GPS: N 11. W 60.

Landmark (please specify) _____

Weather (circle one) Clear Overcast Rain Stormy Unknown

Activity (circle one) Approach Body Pitting Digging Laying Covering

Camouflaging Leaving Gone Unknown Dead

Outcome (circle one) Confirmed Lay Estimated Lay False Crawl

False Crawl with Body Pit Poaching Dead Stranding Unknown

TAGS & MEASUREMENTS other)

Left Flipper Tag _____ NEW OLD

Left Flipper Tag _____ NEW OLD

Right Flipper Tag _____ NEW OLD

Right Flipper Tag _____ NEW OLD

PIT Tag _____ NEW OLD

PIT Tag _____ NEW OLD

CCL (N-N) (cm) _____ CCL (N-T) (CM) _____ CCW (cm) _____

Does carapace damage affect measurement? YES NO

NOTES (Injuries/ Parasites/

OBSERVERS (Please print name in BLOCK LETTERS)

Head Patroller _____

Volunteers _____

_____

_____

_____

Tourists _____ Residents _____

Nest Relocation Date _____

Time collected _____

Time reburied _____

Location Name _____

Zone _____

Egg Count _____

GPS: N 11. W 60.

Turtle Disturbed by Lights (circle one) YES NO

Turtle Disturbed by People (circle one) YES NO

SOS HATCHING EVENT DATA SHEET (Please print in BLOCK LETTERS)

Date Emerged | Time Emerged

Date Excavated | Time Excavated | Nest depth (cm)

Species (circle one) LBK HWK GRN Other species (please specify) _____

Location (circle one) TB GR BB Other beach (please specify) _____

Zone (circle one) 1 2 3 4 GPS: N 11. W 60.

Nesting Female Tags | Original Nest Date

Weather (circle one) Clear Overcast Rain Stormy Unknown

No. # Hatchlings

Dead in | Alive in

Dead out | Alive out

Total

Hatchlings Released

Date Released

Time Released

Released

Location

Nest Contents

Shells		Albino	
Pipped Dead		Predated	
Pipped Alive		Maggots/ Beetles	
Unpipped Dead		Fungus	
Unpipped Alive		Bacteria	
Undev/ Embryo		Yolkless	
Mid		Unknown	
Full		**TOTAL**	
Twins			

OBSERVERS

Head Patroller

Volunteers

Tourists | Residents

Hatchlings Disoriented by Lights (circle one)

YES NO

Notes/ Comments

Measurements

#	SCL	SCW	DPTH	WGHT
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

REFERENCES

Bjorndal, K.A., Clovis, T., Reich, K.J., Alkins, G., Eliazar, P.J. & Bolten, A.B. 2008. Juvenile Hawksbill Tagged in The Bahamas Nests in Tobago. *Marine Turtle Newsletter* 122:10-11.

Burke, L., Greenhalgh, S., Prager, D. & Cooper, E. Coastal Capital – Economic Valuation of Coral Reefs in Tobago and St. Lucia. 2008. World Resources Institute.

Cazabon-Mannette, Michelle (2010). The National Sea Turtle Monitoring Programme: A Report on the 2009 Nesting Season and the Launch of the Offshore Component. Turtle Village Trust.

Choi, Ga-Young and Karen L. Eckert. 2009. Manual of Best Practices for Safeguarding Sea Turtle Nesting Beaches. Wider Caribbean Sea Turtle Conservation Network (WIDECAST) Technical Report No. 9. Ballwin, Missouri. 86 pp.

Clovis, T. 2005. Sea Turtle Manual for Nesting Beach Hotels, Staff, Security and Tour Guides. Save Our Sea Turtles (SOS) Tobago and Wider Caribbean Sea Turtle Conservation Network (WIDECAST).

Eckert, K.L. and Horrocks, J. A. (Editors). 2002. Proceedings of "Sea Turtles and Beach Front Lighting: An Interactive Workshop for Industry Professionals and Policy-Makers in Barbados", 13 October 2000. Sponsored by the Wider Caribbean Sea Turtle Conservation Network (WIDECAST), the Barbados Sea Turtle Project, and the Tourism Development Corporation of Barbados. WIDECAST Technical Report 1. v+43pp.

Lagueux, C.J. 2001. Status and Distribution of the Green Turtle, Chelonia mydas, in the Wider Caribbean Region

Law, A. 2009. The Influence of Lunar Phases, Weather and Tidal Patterns on the Nesting Activity of Adult Female Leatherbacks (Dermochelys coriacea) in Tobago, West Indies.

Meylan, A., Shroeder, B., and Mosier, A. 1995. Sea Turtle Nesting Activity in the State of Florida 1979-1992. Fla. Mar. Res. Publ. No. 52. 51pp

Montoya, F. & Drews, C. 2006. Livelihoods, Community Well-Being, and Species Conservation. A Guide for Understanding, Evaluating and Improving the Links in the Context of Marine Turtle Programs. WWF – Marine and Species Program for Latin America and the Caribbean, San Jose, Costa Rica.

Mortimer, J.A & Donnelly, M. 2008. *Eretmochelys imbricata*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3.

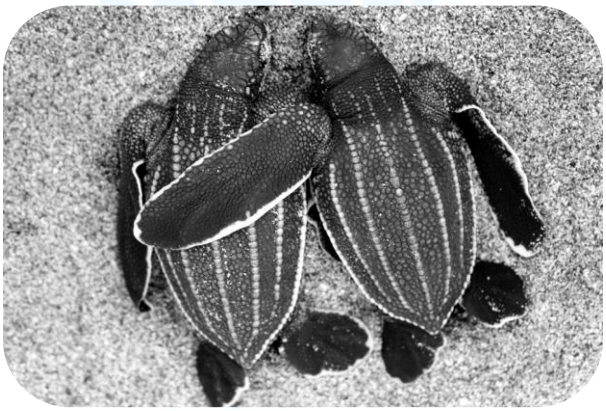
Shand, E.A. 2001. Integrating Biodiversity Conservation into the Tourism Sector in Trinidad and Tobago – A Case of Effective Local Community Participation. Biodiversity Planning Support Programme (UNEP/UNDP/GEF). 41pp

Sarti Martinez, A.L. 2000. *Dermochelys coriacea*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3

Seminoff, J.A. 2004. *Chelonia mydas*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3.

Troëng, S. and Drews C. (2004) Money Talks: Economic Aspects of Marine Turtle Use and Conservation, WWF-International, Gland, Switzerland www.panda.org.

Witherington, B.E. and Martin, R.E. 2000. Understanding, Assessing, and Resolving Light Pollution Problems on Sea Turtle Nesting Beaches. Second edition, revised. Florida Marine Research Institute Technical Report TR-2. 73pp



P.O. Box 27
Scarborough,
Tobago, West Indies
Phone: (868)328-7351
Fax: (868)639-8441
http://www.sos-tobago.org
info@sos-tobago.org
Facebook: SOS Tobago