St Eustatius Sea Turtle Conservation Programme

Annual Report 2007

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List of Acronyms and Abbreviations

AGM ..... ANNUAL GENERAL MEETING

ARGOS ..... ADVANCED RESEARCH AND GLOBAL OBSERVATION SATELLITE

AVID ..... AMERICAN VETERINARY IDENTIFICATION DEVICES

CCL ..... CURVED CARAPACE LENGTH

CCL N-T ..... CURVED CARAPACE LENGTH (NOTCH TO TIP)

CCW ..... CURVED CARAPACE WIDTH

CM ..... *CHELONIA MYDAS*

DC ..... *DERMOCHELYS CORIACEA*

DCNA ..... DUTCH CARIBBEAN NATURE ALLIANCE FOUNDATION

EI ..... *ERETMOCHELYS IMBRICATA*

GPS ..... GLOBAL POSITIONING SYSTEM

IUCN ..... INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE AND NATURAL RESOURCES (WORLD CONSERVATION UNION)

KNAP ..... KLEINE NATUUR PROJECTEN FONDS, NEDERLANDSE ANTILLEN (SMALL NATURE PROJECT FUNDS, NETHERLANDS ANTILLES)

MINA ..... AFDELING MILIEU EN NATUUR (SECTION OF ENVIRONMENT AND NATURE OF THE MINISTRY OF PUBLIC HEALTH AND SOCIAL DEVELOPMENT)

NACRI ..... NETHERLANDS ANTILLES CORAL REEF INITIATIVE

NOAA ..... NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ASSOCIATION

PERS. COMM. ..... PERSONAL COMMUNICATION

PIT ..... PASSIVE INTEGRATED TRANSPONDER

STENAPA ..... ST EUSTATIUS NATIONAL PARKS FOUNDATION

SPAW ..... SPECIALLY PROTECTED AREAS AND WILDLIFE

USVI ..... UNITED STATES VIRGIN ISLANDS

UNEP ..... UNITED NATIONS ENVIRONMENT PROGRAMME

WIDECAST ..... WIDER CARIBBEAN SEA TURTLE CONSERVATION NETWORK

Summary

- The St Eustatius Sea Turtle Conservation Programme was initiated in 2001 due to concerns that the island's sea turtle populations were being threatened due to habitat degradation and destruction. The programme is managed by St Eustatius National Parks Foundation (STENAPA), which is the main environmental non-governmental organization on the island.

- The Sea Turtle Conservation Programme is affiliated to the Wider Caribbean Sea Turtle Conservation Network (WIDECAST) and adopts its monitoring and tagging protocols.

- Since monitoring began, three species of sea turtles have been confirmed nesting on the island; leatherback (*Dermochelys coriacea*), green turtle (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*). There was an unconfirmed nesting by a fourth species, the loggerhead (*Caretta caretta*), in 2004.

- Five nesting beaches have been identified; Zeelandia Beach, Turtle Beach, Lynch Bay, Oranje Bay and Kay Bay. Zeelandia Beach is the primary nesting beach, and the only place where all three species nest regularly; the other beaches are used occasionally by green and hawksbill turtles.

- Daily track surveys are carried out on Zeelandia Beach and Turtle Beach throughout the nesting season. The other nesting beaches were monitored sporadically. Every track is identified to species; categorised as a false crawl or a nest; all nest locations are recorded for inclusion in the nest survival and hatching success study.

- In 2007:
    - Track surveys were conducted daily from 8 March to 23 November; a total of 260 morning surveys were completed.
    - Leatherback nesting activity occurred from 30 March – 18 May
    - 5 leatherback nests (or probable nests) were recorded from March – June on Zeelandia Beach; in addition, two false crawls and one non-nesting track were also observed on Zeelandia and Oranje Bay.
    - A leatherback nesting attempt was recorded on 18 May, 2007 on Oranje Bay. The turtle attempted to nest but hit rocks and abandoned the attempt. The non-nesting track on Oranje Bay was the first reported case of a leatherback attempt to nest on the Caribbean side of St. Eustatius.
    - All leatherback nests that were recorded were on Zeelandia Beach.
    - A member of the public reported seeing turtle tracks on Oranje Bay behind a dive centre, Dive Statia, on 11 May, 2007. The Marine Turtle Progamme Co-ordinator investigated behind the dive centre but could not find any tracks or anything resembling a nesting site.
    - Green turtles were recorded from 15 July until 16 September; 5 nests and 34 false crawls were encountered; nesting was on Zeelandia Beach but false crawls were on Zeelandia, Turtle Beach and Kay Bay.

- Hawksbill turtles were observed from the 8 July until 13 November. Two nests and 13 false crawls were recorded. Hawksbills nested on Zeelandia (2 nests), but recorded false crawls on Zeelandia and Crook's Castle.

- Night patrols are only conducted on Zeelandia Beach due to limited personnel and minimal nesting on other beaches; patrols run from 9.00pm – 4.00am. Each turtle encountered is identified to species; tagged with external flipper tags and an internal PIT tag (leatherbacks only); standard carapace length and width measurements are taken; nest locations are recorded for inclusion in the nest survival and hatching success study.

- In 2007:
  - Night patrols were conducted from 30 March – 26 September; 119 patrols were completed, totalling 719.22 hours of monitoring.
  - Three leatherback, one green turtle and two hawksbill turtles were encountered during patrols; all leatherbacks received external flipper tags.
  - The first green turtle was observed on 29 July. She successfully nested and had a tag which showed that she was tagged previously in 2002. She was also observed in 2005. This turtle nested approximately four times during the 2007 season including 2 September 2007 when she was fitted with a satellite transmitter.
  - No hawksbills were tagged during the 2007 season. Two hawksbills were seen but one did not break the high tide line while the other was unable to be tagged.
  - One green turtle during the night patrol was selected for satellite tracking in 2007. This was the last satellite transmitter that was applied for the DCNA Turtle Tracking Project. This has been the third consecutive year that the Dutch Caribbean Nature Alliance Satellite Tracking Project has been conducted and successfully accomplished.

- Average carapace measurements for females nesting in 2007:
  - Leatherback: Curved carapace length (CCL) = 147.00 cm; Curved carapace width (CCW) = 110.3 cm
  - Green: CCL = 110.0 cm; CCW = 105.5 cm
  - Hawksbill: CCL = 88.0 cm; CCW = 73.0 cm.

- All marked nests were included in a study of nest survival and hatching success. During track surveys they are monitored for signs of disturbance or predation; close to the expected hatching date the observers record signs of hatchling emergence. Two days after hatchling tracks have been recorded the nest is excavated to determine hatching and emerging success.

- In 2007:
  - 12 nests were marked: five leatherbacks, five greens and two hawksbill nests.
  - 2 nests were lost during the incubation period; both were leatherback nests lost due to high tides near natural nests near stake 22-25.
  - Mean incubation period for leatherbacks was 58 days, for greens 55.25 days and for hawksbills was indeterminable since none survived.
  - One hawksbill nest was laid on Zeelandia beach on 12 November. A local resident observed hatchlings on 31 December but after 11 days of searching, the nest could not be relocated and the nest (EI0702R) was declared "Partially Hatched".

- Excavations were performed on 12 nests; five leatherbacks, five greens and two hawksbill nests.
    - Average egg chamber depth varied between the three species: leatherback = 64.67 cm, green = 53.25cm and hawksbill = 53cm.
    - Mean clutch size for each species: leatherback = 66 yolked + 30.7 yolkless eggs and green = 130 yolked + 0.25 yolkless eggs. Hawksbills are indeterminable since none hatched successfully.
    - Five nests hatched or partly hatched leaving one that was washed away by the tide (CM0705); two that could not be located and three that failed to hatch.
    - Leatherbacks showed identical hatching and emerging success rate from 2006; 21.16% hatching success compared to 21.1%, but higher emerging success of 64.58% to just 15.3% in 2006.
    - Greens were more successful in 2006 and hatching success was 33.84% compared to 51.0% in 2006, but emerging success was 57.18% in 2007 and 46.4% for 2006.
    - The survival of nests varied but overall was not very high. All nests were laid on Zeelandia Beach.
    - In future years the practise of relocating nests laid in erosion zones to safer sections of the beach will continue.

- On 29 April, 2007, a stranded leatherback turtle was encountered by the Marine Park intern, Mirella Wognum, on Zeelandia Beach during a morning track survey at approximately 08:15. Lacking the necessary equipment to perform a necropsy the turtle was moved above the surf line, to ensure that it was not swept away by the tide. Later that day the remains of the turtle washed northward to stake number 1. The Programme Co-ordinator, , assisted by Marine Park interns Liz Hartel and Mirella Wognum, returned and performed a rudimentary necropsy to try and determine the cause of death.

- On the morning of 16th of May, STENAPA staff came across a drowned Hawksbill on the City Harbor. The juvenile hawksbill had been trapped in the net of a local fisherman and could not free itself from the nets, subsequently drowning.

- On the 7th of November, a stranded Green Turtle was discovered by a local diver, Derrick Goudrian, in Oranje Bay nearby dive site Blue Bead Hole. Mr. Goudrian presented the deceased turtle to STENAPA staff which took photos and buried the juvenile Green nearby Zeelandia beach. Unfortunately the Programme Coordinator was away on holiday and unable to perform a necropsy.

- A satellite tracking project was initiated in 2005 by the Dutch Caribbean Nature Alliance (DCNA) and concluded in 2007. This research was an inter-island collaboration between STENAPA and the Nature Foundation St Maarten. Dr Robert van Dam was the lead biologist, providing expertise and training in satellite telemetry methodology.

- The two turtles tracked by satellite since 2006 continued into 2007. In mid-September 2006, two turtles received their tracking satellites. Lisa, a hawksbill turtle, was fitted with a satellite transmitter while Grace, the green turtle, was fitted with a transmitter. Lisa's last transmission was 1 February 2007. From the time of her nesting on Zeelandia beach until the time of her last transmission, Lisa had traveled a total of 2870km. Grace transmitted from sea grass beds off the waters of St. Kitts and Nevis. Grace's last transmission was on 6 June 2007 at 18:18:09. During the lifetime for the transmission, Grace traveled a total of 4412km in her foraging grounds.

- On 1 September 2007, a green turtle arrived on Zeelandia Beach at 23:27. She was previously recorded in 2002 and in 2005. The Green turtle, named "Track", attempted to nest but found the area she chose too rocky. On her way back to the water she was placed in a turtle holding pen and her satellite transmitter was activated at 00:11. She was released back into the ocean at 03:20, Sunday the 2nd of September.
- All STENAPA volunteers and interns, along with Arturo Herrera, Marine Turtle Programme Coordinator, as well as several local residents were present for this major event. The entire process was videotaped by Dwight Barran and aired on Channel 15 on 6 September from 7:30 to 8:00pm.
- Track made a brief stop at Prickly Pear Island in the British Virgin Islands. Track then skimmed the northern coast of Puerto Rico and stopped off the north-east coast of Dominican Republic. At the time of writing this report, Track was currently in the same feeding grounds of El Macao, Santo Domingo.
- STENAPA has been in contact with Yolanda Leon, a known turtle biologist from the Dominican Republic. Ms Leon stated that there are many beaches in the area where Track is located. Track entered an area of intense tourism development, however, there are nearby areas with less developed beaches and offshore sea grass. One particular beach in this area was a historically important leatherback nesting beach.
- Track's satellite transmitter stopped responding approximately 23 December 2007. At her last transmission, she was still in the same feeding grounds as previously indicated.
- In concurrence with attaching the final satellite transmitter, the Marine Turtle Programme Coordinator visited all the island schools to give a brief presentation to all students. The motive for these visits was to educate and inform the local students of two different competitions in relation to this project.

- Beach erosion continued on Zeelandia Beach in 2007:
  - Many of the numbered marker stakes were lost due to high tides. Approximately, 21 were replaced.
  - Beach mapping and erosion monitoring was continued this year. Data were collected February, May, August and December. Data was compared for seasonal changes as well as yearly changes. All months were compared for within the year changes. 28.13% of the stakes had recorded a positional change from the cliffs that were less than 50cm from their December positions. 40.63% of the stakes recorded a positional change of 50-100cm while 29.69% of the stakes recorded a change of over 100cm. Seventeen of the stakes moved between one to two meters while two moved more than two meters. The data do point to extensive cliff erosion, and possibly steady to accelerating erosion. Preliminary data stills needs multiple year analyses before any tangible conclusions can be made.
  - Sand mining compounds the erosion problem at the northern end of Zeelandia Beach. Despite being an illegal activity, it occurred throughout 2007, in the gully and on the beach.
  - Seven major cliff falls and 16 minor cliff falls were recorded from February to December.
  - Monitoring of erosion will be a priority for 2008. A suggestion for 2008 is to monitor erosion rates and create a water table study to see if there is a correlation.

- Several different community activities were conducted in 2007:
  - In 2005 the "Help Out or Sea Turtles Miss Out" programme, teaching the local communities about sea turtle conservation issues, with Education Officer Dominique

Vissenburg, was particularly successful. In 2006/7, the year the focus of the school education programme was water.

- On 11 February, 2007 the Marine Turtle Program Co-ordinator gave a presentation to the public. The title of the presentation was regarding the conservation of marine turtles on St Eustatius. Among the persons present were eight University of St. Eustatius medical students.
- On 21 March, 2007, a presentation was given to STENAPA's Junior Rangers regarding the history of turtles in the Caribbean, their current threats and laws protecting them. The presentation was called "Sea Turtle Conservation And Laws Protecting Them". Furthermore, in the month of December, there were also sessions with Junior Ranger I and II regarding marine turtles and their habitat.
- During July 2007, STENAPA started its inaugural STENAPA Summer Club. Twenty-four children aged eight to 13 signed up for the club which included hiking, snorkeling and turtle education activities. STENAPA's Summer Club ran from 2 July to 2 August every Monday, Wednesday and Thursday.
- On 5 December, in conjunction, with the St. Eustatius Marine Park 10 year anniversary, a one hour seminar for the general public was given on the Biology, Ecology and History of Turtles in St. Eustatius Marine Park at the Golden Era Hotel.

- Twelve beach clean-ups were conducted on Zeelandia Beach. Cleanups were performed on Zeelandia Beach, Turtle Beach, Lynch Beach and Oranje Bay. This was the first recorded time that Lynch Beach had rubbish removed from its beach. The September cleanup coincided with Ocean Conservancy's International Coastal Cleanup™ Campaign on 15 September. Beach cleanups were carried out by the Sea Turtle Conservation Programme Coordinator, STENAPA board, staff and interns, Working Abroad volunteers, local citizens and BroadReach volunteers.
  - A total of 22 trucks full of rubbish bags were removed, including a large mooring rope, fishing nets, oil barrel, fishing ropes and buoys, several pallets.
  - Local citizens were on hand in several beach cleanups (March, July and September).
  - On 15 September 2007, volunteers gathered on Zeelandia Beach to participate in the largest singular most successful worldwide volunteer movement, the International Coastal Cleanup. This particular beach clean up was unique because it was the first time St. Eustatius National Parks, STENAPA, collaborated with The Ocean Conservancy on this event.
  - During EnviroWeek in the week of 16 October the Junior Rangers, led by Parks Ranger Hannah Leslie, a cleanup was conducted on Venus Bay. This was the first recorded cleanup of Venus Bay by STENAPA.

- The Sea Turtle Conservation Programme was featured in regular articles in the local press, Television and on the radio. The STENAPA quarterly newsletter included several features about the research activities conducted in 2007 and the new website contains several pages dedicated to the programme, with a focus on the culmination of the DCNA Sea Turtle Satellite Tracking Project.

- A new approach was taken for the upcoming season in generating interest from the local population of St. Eustatius. The Marine Turtle Program Co-ordinator spoke with several interested members who were keen to view the nesting activity of a turtle, nest exhumation or a hatchling release. A turtle phone was purchased with a list of interested people to contact when there were

possibilities for seeing turtles. The new approach was popular avenue and a grassroots approach of connecting with marine turtles.

- Staff participated in several regional and international meetings in 2007:
    - The Programme Co-ordinator, Arturo Herrera, attended the 27th International Sea Turtle Symposium in Myrtle Beach, South Carolina USA from 25 to 28 February 2007) and the WIDECAST Annual General Meeting (23 – 24 February 2007).
    - On the first week of December, STENAPA held its Ten Year Marine Park Celebration. Many activities were included and one was the hour-long Marine Turtle presentation held at the Golden Era Restaurant and Hotel on 5 December 2007.

- On 10 June, 2007, STENAPA greeted its first Marine Turtle Intern, Shizu Fukui to St Eustatius. Shizu Fukui is the first Marine Turtle Intern and has had previous experience working with marine turtles, especially, leatherback turtles, in 2006 in Gandoca Costa Rica. Her duties included organizing the turtle aspect of the STENAPA Summer Club, creating a STENAPA Turtle Volunteer Manual, and spearheading a Zeelandia Beach beautification project, as well as night patrolling, morning beach surveys and habitat surveying dives.

- In June 2007, the Zeelandia beautification project commenced. The primary objective is to offer an area on Zeelandia Beach where visitors can enjoy the beach. Another objective is to deter vehicles from driving on the beach, stop sand mining and prevent further erosion. On 15 June 2007, a visitor information board was installed at the primary entrance to Zeelandia Beach. 20 July 2007 was dedicated to the installation of plants and fencing at the prime Zeelandia entrances. On 7 September 2007, another Family Friday was dedicated to replanting of palm trees and yucca plants that succumbed to the warm weather. Three signs have been strategically placed at the entrances. The purpose of these signs is to educate the public about turtles that nest on the beach and remind people not to drive on the beach. STENAPA intern for the Turtle Programme, Zoe Fukui lead this project and hopes the signs will inform the public about the work of the Marine Park to protect turtles by means of nightly turtle patrols, cleaning the beach and protecting the beach from erosion.

- The In-Water Survey and Monitoring project was initiated in January 2007 in order to provide fundamental data on the populations and trends of resident and migrant turtle species that use the surrounding waters of St. Eustatius. The information gathered will be used to monitor, detect trends and assess the habitats where turtles rest, nest and feed. The objective is to build on existing knowledge of the population demographics of marine turtles in the St Eustatius Marine Park. There are no previous in-water studies about the resident sea turtle populations in the area. Equipment such as ArcGIS 9.0 Software and Satellite Imagery was purchased to begin the habitat mapping of the areas where resident turtles may reside. The first habitat map for the Marine Park was produced in May 2007.

- Several recommendations are made for the 2008 season:
    - Continued participation of volunteers, from Working Abroad and the STENAPA Intern Programme.
    - Foster public awareness of the Turtle Programme within the island of St Eustatius and the Netherlands Antilles. Utilize the new television medium along with Dwight Barran to videotape a nesting female turtle for a documentary on nesting females on St. Eustatius.

- Continue with month-long STENAPA Summer Club and have the Turtle Education feature integrated into a fundamental component.
- Monitoring of nesting beaches to continue: daily track surveys on all beaches and night patrols of the primary nesting beach.
- Further development of the research programme: expand the focus of the programme by implementing an in-water survey of juvenile turtles and continue the satellite tracking project.
- A proposal to extend the satellite tracking to leatherback turtles for DCNA.
- Monitoring of erosion should also become a priority. In addition, monitor the water table at Zeelandia beach to determine if the subterranean water levels are causing possible egg failure but more importantly accelerating possible beach erosion.
- As well as the monitoring of erosion, continue to develop the Zeelandia Beautification Project to include a concrete turtle and possible a picnics area for individuals interested in the beauty of Zeelandia Beach.
- Revitalize the in-water turtle sighting surveys with the local diving centres. This information will help make more informed decisions regarding the in-water monitoring programme.
- Create a turtle baseline study within the Marine Park and a carrying capacity survey.

Introduction

The St Eustatius National Parks Foundation (STENAPA) established the Sea Turtle Conservation Programme following concerns that the island's sea turtle populations were being threatened by anthropogenic disturbance and destruction of nesting beach habitats through sand mining, joy riding and pollution.

A community outreach campaign was organised in 2001, to begin raising public awareness about sea turtle conservation issues. Subsequent to this initiative, a beach monitoring programme was started in 2002, in affiliation with the Wider Caribbean Sea Turtle Conservation Network (WIDECAST). The first year of the programme saw very limited and sporadic monitoring of the primary nesting beach due to a lack of personnel; however, in 2003 regular night patrols were made possible following the introduction of the Working Abroad Programme, which brings groups of international volunteers to assist with projects in the National and Marine Parks. By 2004 the programme had expanded to include daily patrols on several of the island's nesting beaches, with a dedicated vehicle and a full-time project co-ordinator during the nesting season.

Data from the Sea Turtle Conservation Programme have shown that three species of sea turtle regularly nest on St Eustatius; the leatherback (*Dermochelys coriacea*), the green (*Chelonia mydas*) and the hawksbill (*Eretmochelys imbricata*), all of which are classified as either endangered or critically endangered by the IUCN. There has also been an unconfirmed report of nesting by a fourth species, the loggerhead (*Caretta caretta*), which is classed as threatened by the IUCN.

The ultimate objective of the St Eustatius Sea Turtle Conservation Programme is to promote the long-term survival of the sea turtle populations on and around the island. This goal is achieved by safeguarding critical sea turtle habitats; conducting research to provide policy and decision makers with current, relevant data on the status of sea turtles in the region, and limiting environmental impacts on nesting beaches and in near-shore waters. One of the most important factors to ensure the success of the project is the direct involvement of the local community in the programme to promote a better understanding of the importance of long-term conservation, not just for sea turtles but for other locally threatened species.

The aims of this Annual Report include the following:

- Summarise the activities of the Sea Turtle Conservation Programme conducted in 2007.
- Review the accomplishments and deficiencies of the programme in 2007, and suggest recommendations for 2008.
- Provide a summary of the data from 2007 research initiatives.
- Present information locally, regionally and internationally about the research and monitoring programme on the island.
- Produce a progress report for the Island Government, programme funding organisations, the local community and international volunteers.

Participating organisations

St Eustatius National Parks Foundation (STENAPA)

The Sea Turtle Conservation Programme is co-ordinated by the St Eustatius National Parks Foundation (STENAPA), which is the main non-governmental environmental organization on the island of St Eustatius (known locally as Statia). In 1996, STENAPA was given a legal mandate by the Island Government to administer a new Marine Park and, in 1998, for a new National Park; STENAPA also manages the Miriam C. Schmidt Botanical Garden. The Marine Park surrounds St Eustatius from the high water mark to the 30 metre depth contour; there are two marine reserves within the Marine Park, which are designated no-take zones and are in place to protect marine habitats and to reduce fishing pressures. The Marine Park staff conducts regular patrols and enforcement, maintain dive, snorkel and yacht moorings and conduct many educational programmes, such as the Snorkel Club and the Junior Ranger Club, in addition to research and monitoring activities such as the Sea Turtle Conservation Programme.

STENAPA is a not-for-profit foundation, relying on government subsidies, grants and minimal income from divers, yachts and hikers to conduct its activities. STENAPA has only eight staff and is reliant on volunteers to run projects such as the Sea Turtle Conservation Programme. The organisation is supported by two international volunteer programmes; the STENAPA Internship Programme and the Working Abroad Programme, which are discussed in more detail below.

STENAPA Internship Programme

Since the inception of the Internship Programme in September 2001, over 43 interns from various countries including Great Britain, the USA, Canada, Holland, Belgium, Hungary, Germany and New Zealand have helped accomplish projects at the Botanical Garden, in the Quill National Park, in the Marine Park; they have also assisted with educational programmes in the local schools. Interns are responsible for overseeing the daily activities of volunteers from the Working Abroad Programme, in addition to managing and completing individual assignments.

Interns are provided with a small monthly stipend, basic accommodation and the use of a truck during their six-month stay; however, they are personally responsible for all travel costs, and living expenses while on the island. The internships allow students and professionals to gain valuable practical experience in their chosen field. Without these dedicated volunteers, STENAPA would not be able to conduct many of its projects, since the Foundation could not afford such manpower or expertise.

Working Abroad Programme – Statia Conservation Project

Working Abroad is an international networking service based in UK that, since it was founded in 1997, has established volunteer projects in over 150 countries worldwide. STENAPA started its collaboration with the Working Abroad Programme in January 2003, and to date a total of 115 volunteers have been recruited via their organisation. On St Eustatius groups of up to eight volunteers stay for two months and assist in the development of the Botanical Garden, conduct maintenance of the National Park trails and, during turtle season, participate in night-time beach patrols. For their stay each volunteer pays approximately US$1700 towards food, water, lodging, truck hire, fuel and a project expenses fee (this does not include international travelling costs or personal living expenses during their stay).

Wider Caribbean Sea Turtle Conservation Network (WIDECAST)

The St Eustatius Sea Turtle Conservation Programme is affiliated to the Wider Caribbean Sea Turtle Conservation Network (WIDECAST). Founded in 1981, WIDECAST represents the largest network of sea turtle research and conservation projects in the world; with members in over 30 Caribbean states and territories. Affiliation provides access to a collaborative framework of organisations within the region, with a strong emphasis on information exchange, training and active community participation. WIDECAST promotes interaction between different stakeholder groups to ensure effective management and conservation of turtle populations in the Caribbean.

In June 2003, STENAPA Manager Nicole Esteban was appointed WIDECAST Country Co-ordinator for St Eustatius, following completion of a training course in St Croix (US Virgin Islands). Subsequent to this, the St Eustatius Sea Turtle Conservation Programme implemented WIDECAST-approved protocols for monitoring and data collection. WIDECAST has assisted the programme through donation of tags and purchase of PIT tag applicator. The Sea Turtle Programme Co-ordinator attended the WIDECAST Annual General Meetings in 2004, 2005 and 2006; with funding and logistical assistance provided in part through WIDECAST.

Dutch Caribbean Nature Alliance (DCNA)

The DCNA was founded in 2005, and represents a formal coalition of the six nature conservation management organizations of the Netherlands Antilles and Aruba, with representation from international agencies, central government and financial experts. Their main goals are to safeguard the biodiversity and promote sustainable management of the natural resources of the islands, through the establishment of long-term, sustainable funding sources. The Manager of STENAPA is currently the chairperson of the DCNA.

Funding agencies and donors

To effectively run the Sea Turtle Conservation Programme, the STENAPA Manager and Project Co-ordinator allocate approximately 10 to 30% of their time to raise funds to cover the annual programme costs. Fundraising occurs both locally and internationally by soliciting specific organisations, and by donation requests through newsletters and turtle awareness campaigns.

Organisations that have contributed (directly or indirectly) to the Sea Turtle Conservation Programme in 2007 are:

- Dutch Caribbean Nature Alliance (DCNA)
- Travel Committee of the International Sea Turtle Society
- USONA Programme of the Netherlands Antilles
- Wider Caribbean Sea Turtle Conservation Network (WIDECAST), USA
- World Turtle Trust (WTT), USA
- Working Abroad Programme, France
- Vecenergy, France

We also acknowledge those individuals who have contributed to the success of the programme by donating their time or providing financial assistance.

Study Sites

St Eustatius

The island of St Eustatius is part of the Netherlands Antilles that includes Bonaire, Curaçao, St Maarten, Saba and St Eustatius. It lies in the North-eastern Caribbean, and is located in the Windward Islands, lying within the longitude and latitude median of 17º30 North and 62º58 West; the sister islands of Saba and St Maarten stretch out 30km north-west and 63km north, respectively (See Figure 1).

St Eustatius is 21km² in size and is dominated by two volcanoes; an extinct volcano comprising the "Northern Hills" (150 million years old) and a dormant volcano called the "Quill" in the south, formed 2200 to 3200 years ago. As a result of its volcanic origin, the beaches of St Eustatius all have dark sand.

Figure 1. Map showing location of St Eustatius in the Eastern Caribbean

Sea Turtle Nesting Beaches

Since the initiation of the Sea Turtle Conservation Programme in 2002, nesting activity has been recorded at five beaches on St Eustatius: Zeelandia Beach, Turtle Beach and Lynch Bay on the Atlantic side of the island, and Oranje Bay and Kay Bay on the Caribbean side (See Figure 2). There follows a brief description of each of these beaches.

Figure 2. Map showing location of nesting beaches on St Eustatius

Zeelandia Beach

At over 1km this is the longest beach on St Eustatius; it is directly linked to Turtle Beach at its southern end. It is quite a narrow beach backed by cliffs, except in the northern 200m where these is a relatively sparse border of Sea Grape trees (*Coccoloba uvifera*). In this region there are also the remains of an abandoned hotel behind the beach and the principal public access area. Ground vegetation is not extensive, limited to small patches of Beach Morning Glory (*Ipomoea pes-caprae*) and an unidentified succulent-type plant, which are both grazed by cows that occasionally shelter under the sea grape trees. The beach is very dynamic with considerable sand movement throughout the year; despite this it is still the most stable, permanent beach on the island. Erosion is extensive close to the access area, especially following heavy rains; the problem is exacerbated by sand removal in that region. Close to the southern end of the beach is a large storm water gut which acts as the landfill for the island's household waste. It is the primary turtle nesting beach hosting three species of turtle (green, leatherback and hawksbill), and the only place on the island where leatherbacks have been recorded nesting. It is the only beach monitored at night by the Sea Turtle Conservation Programme.

Turtle Beach

This is the second longest beach on the Atlantic side, measuring approximately 400m. It links to Zeelandia Beach at its northern point, and connects to Lynch Bay around a point to the south. It is a steeply sloping bay, which is subject to considerable sand movement especially during the hurricane season (June – November). It is backed by cliffs and there is virtually no vegetation except for occasional Sea Grape trees on the cliffs. There is a storm water gut in the middle of the beach which was formerly used as the land-fill for the island; although not currently used this gut still contains a large amount of refuse and is open to

the beach. Nesting activity to date has been limited to green turtles. Unfortunately access to this beach at night is often prohibited due to the tides, and therefore it is only patrolled during the day except when conditions permit.

Lynch Bay

This very small, rocky beach is located around the point to the south of Turtle Beach; it is approximately 200m long. There is considerable ground vegetation cover, primarily Beach Morning Glory and it is backed by a sloping cliff which provides the only access when tides prohibit movement from Turtle Beach. Unlike many of the other beaches on the island Lynch Bay is stable due to the adjacent reef barrier that provides a natural shelter and also for sand retention. Green and hawksbill nesting activity has been recorded at this beach, and it was the site of an unconfirmed loggerhead nesting event in 2004 (I. Berkel, Pers. Comm.). Due to access issues, Lynch Bay can only be monitored safely during the day.

Oranje Bay

This is a very dynamic sandy beach on the Caribbean side of the island; it experiences considerable sand movement throughout the year. It stretches for almost 2km and runs into the harbour at its southern end. The beach is bordered by grass and the occasional Coconut Palm (*Cocos nucifera*) in addition to several hotels and shops; there are also ruins of warehouses on the sand and in the near-shore waters along its entire length. Very little nesting of green and hawksbill turtles has been observed, due to which fact it is not monitored regularly.

Kay Bay

This is a short, rocky bay on the Caribbean side of the island; approximately 200m long. It is backed by a high cliff, which has a few Sea Grape trees; there is no other vegetation cover. Green and hawksbill turtles have been recorded nesting on this beach. The only access to Kay Bay is via private residential properties; the owners of one property report any signs of turtle nesting activity to STENAPA as this beach is not monitored on a regular basis.

Methodology

Pre-Season Preparations

The Sea Turtle Conservation Programme 2007 commenced with the following pre-season activities:

Beach Preparation

To prepare the primary nesting beach for patrols, numbered stakes were positioned at 20m intervals along Zeelandia Beach; these stakes are used to mark the location of all nests or false crawls recorded

during day or night patrols. Each stake was placed as close as possible to the vegetation or cliff behind the beach. Some stakes were remaining from the 2006 season, these were repainted; any that were missing were replaced.

Training of Volunteers

The materials used for training volunteers about the Sea Turtle Conservation Programme were reviewed before the first group from Working Abroad arrived in February 2007. Two short presentations were created; the first was a basic introduction to sea turtles, their biology and nesting behaviour; the second focused on beach monitoring protocols and the correct use of the data collection sheets. Every volunteer received training before assisting with beach monitoring.

Other Preparations

At the conclusion of the 2007 nesting season, the following activities were performed:

Selection of New Programme Co-ordinator

In October the existing Programme Co-ordinator, Arturo Herrera, announced his resignation from the position; he accepted a new job as the Project Director of a turtle conservation organisation in Costa Rica. He remains in St Eustatius until February 2008 to oversee the end of the nesting season, begin the in-water surveys and to train the new Programme Co-ordinator.

Monitoring and Research Activities

During the 2007 nesting season several different monitoring and research activities were conducted as part of the Sea Turtle Conservation Programme:

Track Surveys

Daily track surveys were conducted on the primary nesting beach (Zeelandia Beach) and Turtle Beach; surveys of other beaches were performed periodically when deemed necessary. These surveys provide data on the temporal and spatial utilisation of previously identified turtle nesting beaches throughout the nesting season. For each track observed the following information is recorded (See example of data collection sheet in Appendix 1):

- Observer – Name of observer recording data.
- Date
- Weather – Brief description of environmental conditions.
- Moon phase – Based on the previous night's moon; this information is recorded to determine whether there is a relationship between moon phase and emergence.
- Species – If possible to determine from the track.
- Track width – Measured as the straight-line distance between the outer flipper edge marks; taken to the nearest millimetre. For each track the width is measured at three random locations and the average used in analyses.
- Track depth – measured as a straight-line distance from the peduncle or cloacae (if turtle is present to the bottom of the nest.
- GPS location – Measured either at the centre of the nest or at the apex of a false crawl track.
- Locale name – Name of the beach.

- Triangulation measurements to two landmarks – Straight-line distance to the two nearest numbered stakes; taken to the nearest centimetre. Measured either from the centre of the nest or at the apex of a false crawl track.
- Distance to vegetation – Straight-line distance to the vegetation behind the beach or to the cliff if no vegetation; taken to the nearest centimetre. Measured either from the centre of the nest or at the apex of a false crawl track.
- Distance to high tide line – Straight-line distance to the most recent high-tide line; taken to the nearest centimetre. Measured either from the centre of the nest or at the apex of a false crawl track.
- Number of unsuccessful nest cavities – If the turtle made more than one attempt at nesting during the same emergence.
- Result of nesting attempt – Recorded as either lay, probable lay, false crawl (when some nesting activity observed) or track only (no nesting activity at all).

All marked nests were monitored daily and their status recorded; any disturbed or destroyed nests were noted. After the data have been recorded a line is drawn in the sand through both tracks to indicate that it has been registered, ensuring that data are not collected twice for the same track. Surveys were conducted as early as possible in the morning to prevent tracks from being disturbed or washed away. For continuity, and to increase the accuracy of data collection, surveys were conducted by the Programme Co-ordinator or trained personnel in her absence.

Beach Patrols

Nightly beach patrols were conducted on Zeelandia Beach and, when tidal conditions permitted, Turtle Beach; data from previous years show very low nesting densities at other beaches, making it an inefficient use of resources to carry out night patrols at these other locations. Each patrol consisted of a minimum of two people; including either the Programme Co-ordinator or an intern when possible, although occasionally two Working Abroad volunteers conducted a patrol together. A stretch of beach approximately 1km in length was monitored on Zeelandia Beach (up to 1.6km when Turtle Beach was included) from the cliffs at the northern end to just south of Smith's Gut; hourly patrols of this section were conducted between 9.00pm - 4.00am.

The primary objective of the beach patrols was to encounter as many nesting turtles as possible; to tag them with flipper and/or internal tags as appropriate, collect carapace measurements, mark the location of the nest for inclusion in a nesting success survey and relocate any nests laid in designated erosion zones. For each turtle observed the following data were recorded (See example of data collection sheet in Appendix 1):

- Observer – Name of observer recording data.
- Date – Patrols span two dates but to avoid confusion the first date is used throughout the entire patrol.
- Time – At the moment the turtle is first encountered
- Weather – Brief description of environmental conditions.
- Moon phase – This information is recorded to determine whether there is a relationship between moon phase and nesting emergence.
- Species – If the turtle is not observed the species is determined from the track, where possible.
- Gender
- Tag information – See detailed description below of data recorded.

- Activity – At the moment the turtle is first encountered. Classed as emerging, searching, body pitting, digging egg chamber, laying, covering, disguising, gone (used if turtle has returned to the sea).
- Carapace Length – See detailed description below of measurements taken for each species.
- Carapace Width - See detailed description below of measurements taken for each species.
- Parasites/Ectobiota – The presence of any parasites on the turtle are recorded, with a brief description of the parasite; its location is indicated on a diagram on the data collection sheet.
- Injuries – Any injury to the turtle is described and the location indicated on a diagram on the data collection sheet.
- Notes – Any additional pertinent information about the turtle or their behaviour is recorded here.
- Track width – This is only recorded if the turtle is not observed during the patrol. Measured as the straight-line distance between the outer flipper edge marks; taken to the nearest millimetre. For each track the width is measured at three random locations and the average used in analyses.
- Track depth – measured as a straight-line distance from the peduncle or cloacae (if turtle is present to the bottom of the nest.
- GPS location – Measured either at the centre of the nest or at the apex of a false crawl track. When possible this is taken while the turtle is laying, when the egg chamber is open and the exact location of the eggs is known.
- Locale name – Name of the beach.
- Triangulation measurements to two landmarks – Straight-line distance to the two nearest numbered stakes; taken to the nearest centimetre. Measured either from the centre of the nest or at the apex of a false crawl track. When possible these measurements are made while the turtle is laying so that the exact location of the eggs is known.
- Distance to vegetation – Straight-line distance to the vegetation behind the beach or to the cliff if no vegetation; taken to the nearest centimetre. Measured either from the centre of the nest or at the apex of a false crawl track. When possible this measurement is made while the turtle is laying so that the exact location of the eggs is known.
- Distance to high tide line – Straight-line distance to the most recent high-tide line; taken to the nearest centimetre. Measured either from the centre of the nest or at the apex of a false crawl track. When possible this measurement is made while the turtle is laying so that the exact location of the eggs is known.
- Number of unsuccessful nest cavities – If the turtle made more than one attempt at nesting during the same emergence.
- Result of nesting attempt – Recorded as either lay (when the turtle was seen laying), probable lay (if the nest site suggests that the turtle laid but no eggs were seen), false crawl (when some disturbed sand observed) or track only (no nesting activity at all, no disturbed sand).
- Relocation data – If the nest is deemed to have been laid in an unsuitable location which is prone to erosion or flooding the eggs are relocated to a more secure section of the beach. The following data are recorded for this new nest site.
    - New GPS location – Taken at the centre of the new egg chamber.
    - Triangulation measurements to two landmarks – Straight-line distance to the two numbered stakes closest to the new nest location; taken from the centre of the new egg chamber.
    - Distance to vegetation – Taken from the centre of the new egg chamber.

- Distance to high tide line – Taken from the centre of the new egg chamber.
- The number of eggs – The total number of eggs; also recorded separately are the number of yolked and yolkless eggs.
- Time eggs laid – The time the turtle began to lay eggs.
- Time eggs reburied – The time the eggs were placed in the new egg chamber.

All data were collected either while the turtle was laying or immediately afterwards, when she was covering the nest site; no turtle was touched before she had started laying.

Once the turtle had returned to the sea, a line was drawn in the sand through both tracks to indicate to the person conducting the track survey the following morning that data had been collected, preventing data repetition for the same track or nest.

Tagging Methods

Flipper Tags

Metal flipper tags (National Band and Tag Company, MONEL Style #49: WC251 – WC350 and INCONEL Style #681: WE1 – WE100) were donated by the Marine Turtle Tagging Centre, Barbados, which is affiliated with WIDECAST. All tag applicators are inspected and cleaned on a routine basis and replaced when they cease to function properly.

Standard tagging methods are used, based on the protocols of the Turtle Monitoring Programme in St Croix, USVI. For leatherbacks, external flipper tags are applied to the centre of the fleshy skin located between the back flipper and the tail (See Figure 3). For hard shell species, tags are applied adjacent to the first large scale on the proximal part of the front flipper (See Figure 4), where the swimming stroke will cause minimal tag movement (Balazs, G. H, 1999). Tags are applied while the turtle is covering her nest, immediately after she has finished laying eggs; this is done so that the turtle is not disturbed prior to laying. Two metal tags are attached to each turtle, both leatherbacks and hard-shelled species; this is to ensure that even if one tag is lost the individual can still be recognised. External flipper tags were only applied by trained personnel, either the Programme Co-ordinator or a Marine Park intern.

Passive Integrated Transponder (PIT) Tags

PIT tags were purchased by the Sea Turtle Conservation Programme with funding from KNAP Fund, MINA. For leatherbacks only, in addition to the two external flipper tags, one PIT tag is also applied to each individual. A PIT tag is a small microprocessor which transmits a unique identification number when read using a hand-held scanner. While the turtle is laying, a single PIT tag is inserted under the skin in the front shoulder muscle of the turtle using an applicator (See Figure 3). All leatherbacks encountered were scanned for the presence of PIT tags using an AVID scanner before a PIT tag was inserted, to avoid double-tagging individuals. Only the Programme Co-ordinator and STENAPA Manager were trained to apply PIT tags.

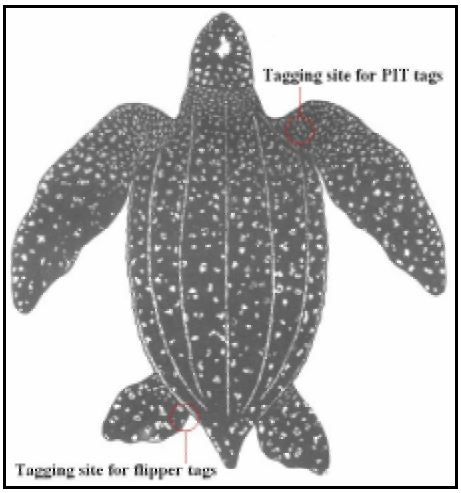


Figure 3. Tagging sites for leatherbacks

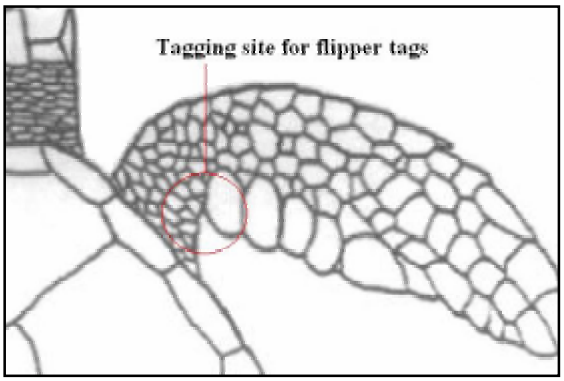
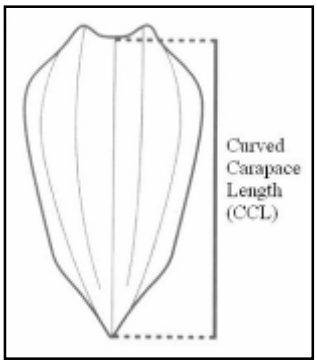


Figure 4. Tagging site for hard shell species

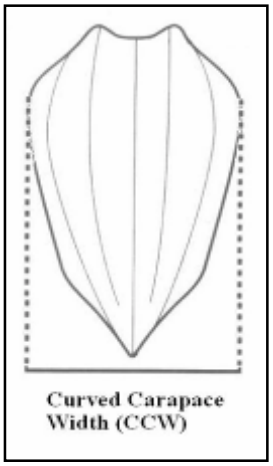
Carapace Measurements

Standard carapace length and width measurements (as of Bolten, 1999) were taken of each nesting turtle encountered, after she had finished laying. Measurements were made using a flexible metal or fibreglass tape measure; each measurement was taken once, to the nearest millimetre.

Leatherback



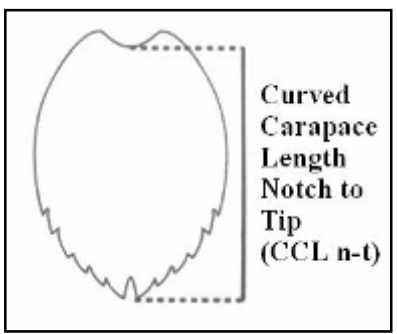
Curved carapace length (CCL) was measured from the nuchal notch (the anterior edge of the carapace where it meets the skin) in a straight line to the most posterior tip of the caudal When the caudal projection is not symmetrical the measurement is made to the longest point (any such irregularity would be noted on the data collection sheet as influencing the measurement). Measurements were taken just to the right of the central ridge, not along its crest, to avoid errors associated with carapace surface irregularities. **Figure 5. Carapace length - leatherback**



Curved carapace width (CCW) is measured at the widest point, but there are no standard features delineating the end points (See Figure 6). The tape measure passes over the ridges and does not follow their contours.

Figure 6. Carapace width – leatherback

Hard shell species



For green and hawksbill turtles the curved carapace length notch to tip (CCL n-t) was measured. It is measured in a

straight line from the anterior point at the mid-line (where the carapace and skin meet) to the posterior tip of the supracaudal scutes (See Figure 7). As the supracaudals are often asymmetrical CCL n-t is taken to the longest tip.

Figure 7. Carapace length –hard shell

Curved carapace width (CCW) is measured in a straight line between the widest points of the carapace (See Figure 8); there are no anatomical features marking the end points.

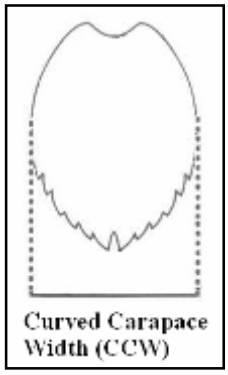


Figure 8. Carapace width – hard shell

Nest Survival and Hatching Success

All nests recorded were included in a study on nest survival and hatching success. Every day during morning track surveys the status of each marked nest was observed; a record was made if a nest was deemed disturbed, destroyed or washed away. Close to the predicted hatching dates (at around 50 days) the triangulation data were used to mark the site of the egg chamber; to prevent the surveyor having to re-measure the nest each day a small "V" of sticks was placed on the sand behind the nest site. This area was closely monitored for evidence of hatching; a depression, hatchling tracks or hatchlings. When any signs of hatching were observed the nest was excavated after 48 hours; if no signs of hatching were recorded the nest was excavated after at least 70 days from the date the eggs were laid. All excavations were conducted by the Programme Co-ordinator or trained personnel to ensure accuracy of data collection.

If a depression or other sign of hatching was present the excavator carefully dug down at this point until the first egg was encountered; if hatching had not been observed the triangulation data were used to locate the expected site of the egg chamber where digging commenced. Using gloves, the nest contents were carefully removed from the egg chamber and inventoried. The following data were recorded for each excavated nest (See example of data collection sheet in Appendix 1):

- Nest code – Each nest was given a unique identification number.
- Observers – Names of people present during excavation.
- Date – The date the nest was laid; when hatching was observed and the date the excavation was conducted.
- Number of empty shells – Only shells corresponding to more than 50% of the egg were counted; representing the number of hatched eggs.
- Number of hatchlings – Any hatchlings found in the egg chamber were recorded; dead or alive.
- Number of unhatched eggs – Eggs were opened to search for the presence of embryos and categorised as:
    - No embryo – No obvious embryo present.
    - Embryo – Embryo present; includes all stages of development.
    - Full embryo – Embryo in final stages of development and ready to hatch.

- Number of pipped eggs – Eggs where hatchling had broken the egg shell but failed to hatch; characterised by triangular hole in the shell. Whether hatchling was alive or dead was also recorded.
- Number of predated eggs – If possible the type of predator was noted; often characterised by a circular hole in the shell.
- Number of deformed embryos – Any deformities were recorded such as missing flippers, additional scutes on carapace, albinism or the presence of multiple embryos in a single egg
- Number of yolkless eggs – Small, yolkless eggs were counted separately.
- Notes – Any additional pertinent information was recorded.
- Depth of nest – To the top of the egg chamber (first egg encountered) and the bottom of the egg chamber (after final egg removed); measure to nearest centimetre.

Any hatchlings found alive were released to the sea. When the inventory was complete the nest contents were returned to the egg chamber and reburied.

In-water Turtle Sightings

To obtain information on in-water sightings of turtles, data collection forms were given to the three dive centres on St Eustatius: Dive Statia, Golden Rock Dive Centre and Scubaqua as well as visiting live-aboard dive vessel Caribbean Explorer (See example of data sheet in Appendix 2). The data form was redesigned in October to have a different focus that would coincide with the upcoming habitat mapping and in-water survey programme that will be instated for the upcoming year. The following data were recorded for each sighting:

- Dive Site – Location where turtle was seen.
- Date
- Time – Time of sighting.
- Dive Centre --- Who the dive centre was when the turtle was sighted.
- Dive Master
- Species of turtle – Green, hawksbill, loggerhead or leatherback.
- Size of turtle – Less than 10cm, 10 – 50cm, 50 – 100cm, more than 100cm.
- Did the tail extend more than 15cm past the shell? – Yes, no, don't know.
- Condition of the turtle – Alive, dead, injured. If injury, a description of the injury.
- Distance from the turtle – less than 3 metres, 3-5 metres, 5-10 metres, over 10 metres.
- Visibility – clarity of the water.
- What depth was the turtle seen –metres.
- Where was the turtle – On the surface, in the water column or at the bottom.
- What was the environment – Sand, sea grass, coral reef, and rock or other (cave, wreck, etc.).
- What was the turtle doing– Resting, mating, swimming or eating?
- Were tags present – Yes, No or Unsure.
- Any other comments

Originally divers were asked to complete the forms whenever they encountered a turtle while diving. Due to the fact that many people could be completing the form for just one turtle, it was decided to let the Dive Master fill out the form. The Programme Co-ordinator visited the dive centres periodically throughout the 2007 season to collect any completed forms.

Sea Turtle Satellite Tracking Project 2005-2007

In June 2005, funding was confirmed from the DCNA to initiate a multiple-year sea turtle tracking project in the Dutch Caribbean. This project was an inter-island initiative between the DCNA, STENAPA and the Nature Foundation St Maarten; led by sea turtle biologist Dr Robert van Dam. The objective was to learn the geographical range of adult female green and hawksbill turtles nesting on St Eustatius and St Maarten, by determining their migratory movements and the location of their feeding grounds. Another important aspect of the project was as a forum to engage local communities in sea turtle conservation issues, by illustrating turtle migratory behaviour from the islands.

Basic Satellite Telemetry

Satellite telemetry involves attaching a small transmitter to the carapace of a turtle; each time the turtle surfaces to breathe, a signal is sent to an ARGOS receiver on-board a polar orbiting NOAA satellite. This signal provides information about the location of the turtle; the signal is classified into one of five location classes depending on its accuracy. This will vary depending on several factors including environmental conditions and relative location of transmitter and satellite. Using satellite transmitters it is possible to follow individuals and gain detailed information about turtle migration and migratory behaviour patterns. By knowing where turtles are going and the routes they use between breeding and feeding areas, researchers can determine potential threats in all areas frequented by turtles and so focus conservation efforts where most needed.

Satellite transmitters are small and lightweight; the Telonics ST-18 used on St Eustatius measured 12cm by 5cm and weighed approximately 200g. Essentially they are electronic components and a battery housed inside a hard plastic casing, with an external antenna at one end. They are designed to be hydrodynamic and so cause minimal disruption to a turtle's natural swimming and diving behaviours. For hard shell species transmitters lie on a layer of elastomer that cushions between the transmitter and the carapace; it is then secured using layers of fibreglass resin.

The fibreglass creates a protective casing for the transmitter against damage on reefs or other hard surfaces during its time in the ocean. Transmitters will normally last several months until the battery fails, the antenna is broken, or it is dislodged from the carapace.

Education and Media Activities

In 2005 the "Help Out or Sea Turtles Miss Out" programme, teaching the local communities about sea turtle conservation issues, with Education Officer Dominique Vissenburg, was particularly successful. In 2006/7, the year the focus of the school education programme was water. Each month, the Education Officer visited the four island primary schools and looks at a specific topic related to the main theme; while on St Eustatius she is provided with logistical support from STENAPA staff.

On 11 February, 2007 the Marine Turtle Program Co-ordinator gave a presentation to the public. The title of the presentation was regarding the conservation of marine turtles on St Eustatius. Among the persons present were eight University of St. Eustatius medical students.

On 21 March, 2007, a presentation was given to STENAPA's Junior Rangers regarding the history of turtles in the Caribbean, their current threats and laws protecting them. The presentation was called "Sea Turtle Conservation And Laws Protecting Them**".** The Junior Rangers seemed to enjoy the presentation and asked many questions that the Marine Turtle Program Co-ordinator was happy to answer.

During the month of July 2007, STENAPA started with its inaugural Summer Club. Thirty children aged eight to 13 signed up for the club which included hiking, snorkeling and turtle education activities. The Summer Club encouraged local children to be more active, while learning more about some of the plants, animals and marine life that can be found on their island. The Summer Club ran from 2 July to 2 August every Monday, Wednesday and Thursday. The club was coordinated by STENAPA staff and assisted by interns and volunteers. Every Wednesday and Thursday, a three hour seminar with hands-on activities about turtles (in classroom and on the beach) was presented to the class.

To raise public awareness of the Sea Turtle Conservation Project, different media events were arranged; these included radio interviews in May, June, July and September, articles in the local newspaper, the quarterly STENAPA newsletter, features regarding satellite tracking on the STENAPA website, and three television features during the government programme on St Eustatius Cable TV Channel 15.

Beach Erosion

When the numbered stakes were placed along Zeelandia Beach before the start of night patrol season, the distance from the stake to the cliff or vegetation was recorded to monitor the extent of erosion along the monitored section of beach. This estimate of erosion has taken place since 2004.

If a significant landslide or cliff fall was encountered during a patrol on any nesting beach, the following data were recorded; the date, time (if known), amount of cliff affected and a description of the damage, including a photograph whenever possible.

Community Outreach Events

Raising community awareness of the Sea Turtle Conservation Programme is a fundamental part of the programme. Various activities were arranged during 2007, which are described below:

School Activities

The Education Officer for the Windward Islands of the Netherlands Antilles, Dominique Vissenberg, visited St Eustatius monthly to coordinate the education activities in schools from January through June. The 2007 theme was water. Other activities, such as satellite tracking competition and STENAPA summer club, were organised.

Beach Clean-Ups

Zeelandia Beach was chosen for Beach Clean-ups as it is the primary turtle nesting beach on the island, and the beach where the majority of the turtle research activities occur. These events were conducted with the aid of staff, interns, volunteers and members of the public. Each clean-up was advertised in advance to encourage participation by the local community. A record was made of the number of participants at each clean-up and the amount and type of rubbish collected. All rubbish was disposed of at the Smith's Gut landfill site.

Media Exposure and Public Presentations

Whenever possible the events of the Sea Turtle Conservation Programme 2007 were publicised in the local newspaper, STENAPA newsletter, on local radio or via the STENAPA website. Public presentations were also given to different groups on the island.

Viewing of nesting turtles and hatchling releases

A new approach was taken for the 2007 season in generating interest from the local population of St. Eustatius. The Marine Turtle Program Co-ordinator spoke with several interested members who were keen to view the nesting activity of a turtle, nest exhumation or a hatchling release. The new approach took on a life of its own and has given a different perspective on turtles on St Eustatius while giving the local community a first hand glimpse of nesting turtles or hatchlings.

Participation in Meetings, Workshops and Symposia

In an effort to broadcast the work of the St Eustatius Sea Turtle Conservation Programme to as wide an audience as possible, the Programme Co-ordinator tried to attend any relevant meetings, workshops or symposia relating to turtle biology, research or conservation issues. Such gatherings create ideal opportunities to establish regional and international contacts within the sea turtle community; these contacts may provide guidance or support to expand and develop the programme on St Eustatius in the future.

Results

Pre-Season Preparations

Beach Preparation

On 3rd March, the Turtle Programme Co-ordinator, and Marine Park intern prepared the numbered beach stakes that were lost between the 2006 to 2007 season. Twenty-one were lost in total as stake 47 was found later. The stakes 54-63 minus 55, stakes 43-49, and stakes 28-33. A total of 65 stakes were prepared and/or reinserted by the Programme Co-ordinator and Marine Park intern; each stake had a number engraved and then painted white. A band of reflective tape was applied to help locate them on the beach at night using a flashlight. Stake 1 was located at the northern limit of Zeelandia Beach and they ended at stake 65, half-way along Turtle Beach.. Only part of Turtle Beach was marked in April as no leatherback nesting had been observed on that beach in previous years; in August temporary stakes were placed on the remainder of Turtle Beach, when green turtle nesting activity was recorded. Over the course of the nesting season some of the stakes were lost due to high tides and beach erosion; these were replaced using temporary markers. Over the course of the season, most stakes have been lost by November 2007.

Training of Volunteers

The Programme Co-ordinator conducted the first training session on 17 March 2007; present were three St Eustatius medical students and all interns. On 23 March, Working Abroad volunteers and all interns were subject to another set of presentations and night patrol training. Each of the three successive groups of Working Abroad volunteers received an identical orientation. In addition to the two theoretical presentations on sea turtle biology and data collection, they received practical training on nest marking methodology and carapace measurements.

All interns received training in external flipper tagging protocols on 23 March; it was hoped that they could tag turtles encountered on nights when the Programme Co-ordinator was not leading beach patrols. However, during the monitoring period, all turtles requiring tags were actually observed on patrols led by the Programme Co-ordinator.

Monitoring and Research Activities

The following is a summary of the data collected during the 2007 monitoring and nesting activities of the Sea Turtle Conservation Programme.

Track Surveys

Daily morning track surveys were conducted between 8 March and 23 November; a total of 261 surveys were completed. The Programme Co-ordinator conducted 68% of the track surveys (177) while interns carried out the surveys in his absence.

Zeelandia Beach was always included in the survey; Turtle Beach was surveyed 211 days, Oranje Bay was surveyed 8 days, Kay Bay 3 days and Lynch Beach was surveyed on 15 occasions during the season. For the last 30 days surveys were limited to Zeelandia and Turtle Beach as nesting activity had ceased; morning surveys were only conducted to monitor marked nests for hatching activity.

The first track was observed on 30 March: a leatherback nest was recorded on Zeelandia Beach. This nest was recorded by Arturo Herrera since no night patrols were being conducted at that time. The last nesting activity was recorded on 13 November when a hawksbill turtle nested on Zeelandia Beach.

Three species of turtle were recorded nesting in 2007; leatherback, green and hawksbill. Leatherback nesting occurred from 30 March to 18 May; green turtle nesting activity was recorded from 15 July until 16 September; two hawksbill nests were recorded, 17 July and 13 November. A total of 12 nests and 49 false crawls for all three species were recorded in 2007. Zeelandia Beach was the primary nesting beach with all nests.

Table 1. Summary of turtle nesting data collected during track surveys in 2007

Species	Number of Nests	Location of Nests	Number of False Crawls	Location of False Crawls
Leatherback	5	All Zeelandia Beach	2	Turtle Beach Oranje Bay

Green	5	All Zeelandia Beach	34	(25) Zeelandia (8) Turtle Beach (1) Kay Bay
Hawksbill	2	All Zeelandia Beach	13	(10) Zeelandia (2) Turtle Beach (1)Crook's Castle

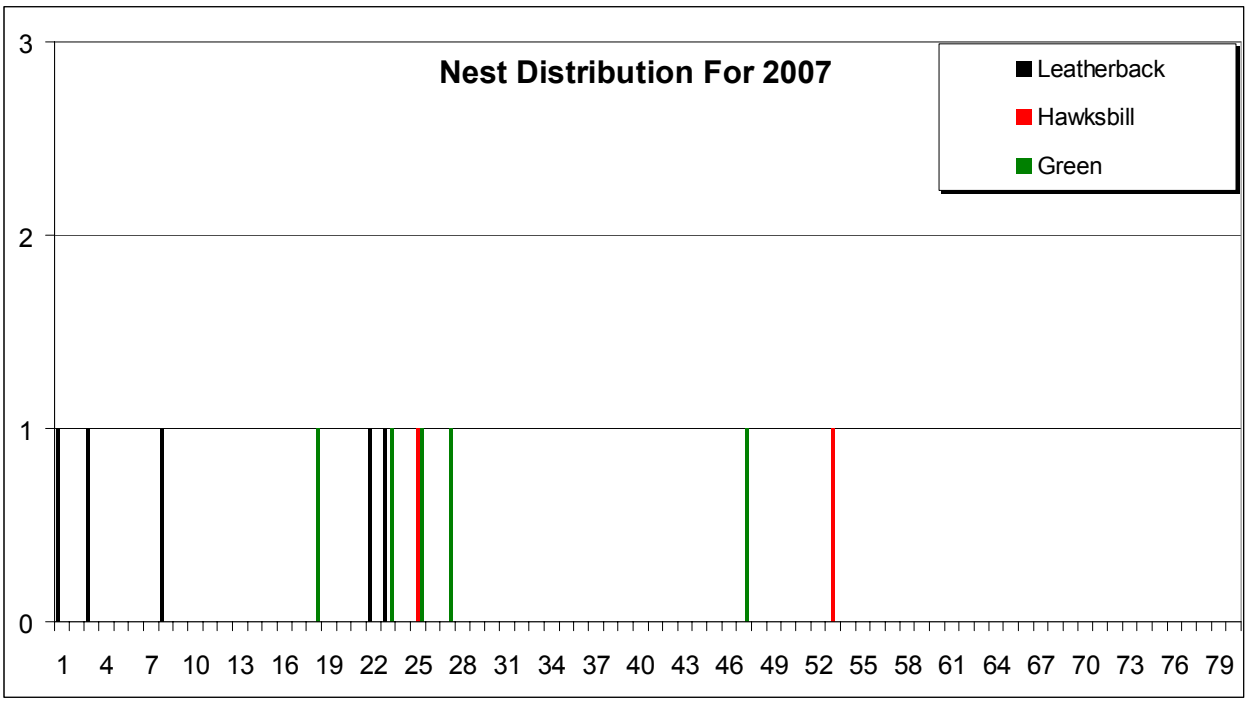


Figure 9. Distribution of nests on St Eustatius Nesting Beaches in 2007

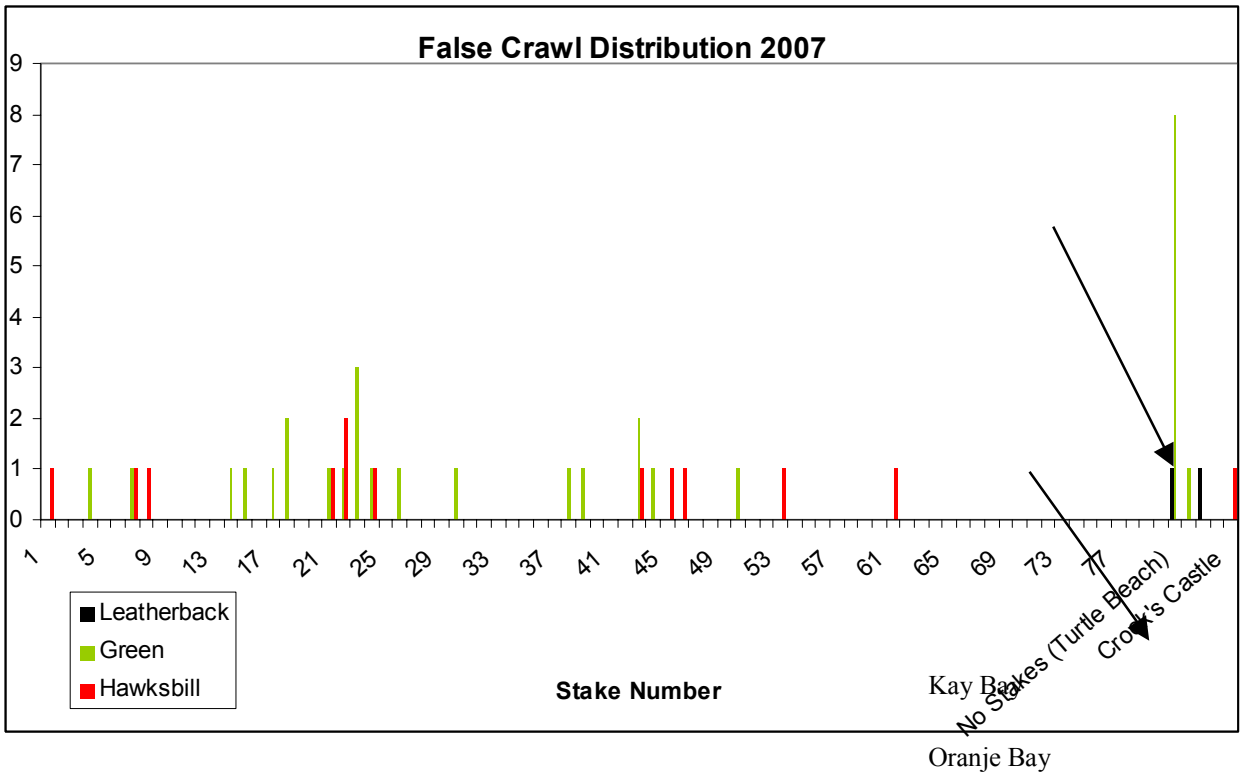


Figure 10. Distribution of false crawls on St Eustatius nesting beaches in 2007

Leatherback nesting activity occurred on Zeelandia Beach and both false crawls were observed on Oranje Bay and Turtle Beach. Nesting was limited to sporadic stretches (See Figures 10 and 11). In Figure 10, it is interesting to note that stakes 8 to 18 are congruent with the main beach entrances. Furthermore, this area has a high density of light pollution emanating from the oil terminal. One possible reason for the limited activity is the amount of light pollution within this area. All turtles used Zeelandia Beach three exclusively for nesting. Green turtles used three beaches for false crawl activities most emergences were on Zeelandia Beach (26) and Turtle Beach (8). The rest of the activities were distributed Kay Bay (1). In contrast, leatherbacks activity was more concentrated than green turtles. There were very few tracks and nests north of marker 24, with activity clustered between markers 4 and 50. Few nests were found north of marker 27. (See Figures 10). Hawksbill activity was confirmed on three of the nesting beaches; Zeelandia one nest near marker 24 one laid in 53. Both were relocated. The false crawls were recorded on Zeelandia (10), Turtle Beach (2) and one on Crooks' Castle.

Beach Patrols

In 2007 monitoring of Zeelandia Beach was performed seven nights per week, to include weekends. Patrols commenced at 9.00pm and ended around 4.00 am; they were conducted along the entire length of Zeelandia Beach and occasionally on Turtle Beach, when tidal conditions permitted.

Night patrols were conducted between 30 March and 26 September; patrols ended on this date as no nesting activity had been observed for 20 consecutive days and it was assumed that the season had finished. In total, 119 patrols were conducted with approximately 719.22 hours of patrol time logged. If insufficient personnel were available patrols were cancelled. This occurred on four occasions: patrols were cancelled or terminated early due to bad weather causing dangerous conditions on the beach. Patrols were cancelled 54 times on account of lack of turtle activity. The Programme Co-

ordinator led 45.38 % of patrols, assisted by interns and volunteers; when not on patrol the Programme Co-ordinator was on stand-by to assist the team on the beach if necessary.

Turtles were encountered on 12 separate nights; approximately 10.8% of patrols, or an encounter rate of 1 turtle every 10 nights. The first leatherback was recorded on 30 March, but the first female encountered was on 9 April. The last recorded leatherback was on the 18 May. The first hawksbill turtle was recorded by Programme Co-ordinator, Arturo Herrera, during a morning survey on 7 July but the first observed hawksbill was seen on 23 July. Finally, the first green individual was recorded on 28 July, and the first observed was on 29 July. The last recorded and observed green turtle was 16 September.

The times of encountering a turtle varied throughout the night. The earliest a turtle was encountered was at 21:06 during a night patrol on 23 July. The turtle was a hawksbill that was untagged. The turtle was digging its egg chamber but abandoned its attempt after finding its location unsuitable. Most night encounters were between 9.06pm and 4.25am with peaks between 21:26 to the hours of 23:47. The latest a turtle was recorded was 4:25am which was a green false crawl on 18 August.

Three leatherback, one green turtle and two hawksbill turtles were encountered during patrols; one leatherback was seen twice, the second which was a false crawl. The average inter-nesting interval for the leatherback was 11.16 days (with a range of 10 – 27 days). Of the only green turtle that nested, she recorded five nests and possibly all false crawls. Since no positive identification was made off all false crawls and the turtle was not seen, it cannot be positively ascertained whether or not the one female green turtle made all false crawls. The average in-nesting interval was 15 days.

Visitors were always welcome on night patrols, both tourists and members of the local community. However, very few people joined researchers in 2007 for a full patrol; only 14 people in total, comprising two staff members, three medical students, two journalists and 7 interested members of the public. This does not include the public that requested to be called to view a nesting turtle or a release of hatchlings. In addition, on two separate nights, a total of 13 students from the Caribbean Marine Reserves Programme (part of the Broadreach Programme) joined patrols on two separate nights. This programme brings groups of high school students from the United States to study how marine reserves are managed and also participate in hands-on field research.

Tagging

Of the six individual females encountered on beach patrols during the 2007 nesting season (See above) only one had tags from previous years. The leatherback turtles that were encountered had no tags (PIT or back flipper tags) when first encountered and were given two external flipper tags in both rear flippers and a single PIT tag in the right-hand shoulder muscle. The green turtle encountered was already tagged. The previously-tagged turtle was a returning green that had been recorded in 2002 and 2005 and returned to nest in 2007. This turtle nested approximately four times during the 2007 season including 2 September 2007 when she was fitted with a satellite transmitter. No hawksbills were tagged during the 2007 season. Two hawksbills were seen but one did not break the high tide line while the other was unable to be tagged. All tagging of turtles was performed by the Programme Co-ordinator.

Carapace Measurements

Standard carapace measurements were taken for each female that was tagged; some individuals were measured more than once, if they were encountered multiple times during the season. Table 2 , Table 3 and Table 4 show the curved carapace length (CCL) and width (CCW) measurements for each leatherback and green turtle encountered, and the mean for each species.

In Table 2, each leatherback turtle encountered was measured only once as none re-nested during the 2007 season; CCL measurements showed 4cm of variability on all leatherbacks, ranging from 145cm to 149cm , with a mean of 147.00cm. Width also varied 19cm for all leatherbacks encountered in 2007; CCW = 101.0cm – 120.0cm, with a mean of 110.3cm

Table 2. Carapace measurements of all leatherback turtles encountered in 2007.

Turtle Identification Number	Curved Carapace Length[1] (CCL) / cm	Curved Carapace Width[1] (CCW) / cm
WC 322/WC 323	147.00	120.00
WC 324/WC 325	145.00	110.00
WC 318/ WC 319	149.00	101.00
Species Mean	**147.00**	**110.3**

Table 3. Carapace measurements of all green turtles encountered in 2007.

Turtle Identification Number	Curved Carapace Length[1] (CCL n-t) / cm	Curved Carapace Width[1] (CCW) / cm
WE 24/ WE 25	110.00	105.00
N/A	114.00	107.00
N/A	112.00	105.00
N/A	108.00	
Species Mean	**111.00**	**105.5**

Individual green turtles showed variation in both carapace length and width than leatherbacks (See Table 3) but the same green turtle was measured four times over the 2007 season; CCL n-t ranged from 114.0 cm – 108.0 cm, with a mean of 111 cm; CCW ranged from 105.0cm – 107.0cm, mean = 105.5.

Table 4. Carapace measurements of all hawksbill turtles encountered in 2007.

[1] If a turtle was encountered on more than one occasion the average of all measurements taken are shown

Turtle Identification Number	Curved Carapace Length[1] (CCL n-t) / cm	Curved Carapace Width[1] (CCW) / cm
N/A	88	73
Species Mean	**88**	**73**

In Table 4, two hawksbill turtles were encountered throughout the course of the 2007 season. Unfortunately, one did not break the surf and therefore was not measured. There were not enough multiple data sets to have repeated measures and determine any variations in CCL and CCW.

Nest Survival and Hatching Success

Twelve nests were marked for inclusion in the nest survival and hatching success study; five leatherbacks, five green turtles and two hawksbills. Tables 5 and 6 provide a summary of the nest survival data obtained from each marked nest of 2007; each table details, for leatherbacks and hard shell species respectively, nest code, turtle identification number, location of the nest, fate of the nest, incubation period in days (if known), and whether the nest was excavated or not.

Table 5. Summary of nest survival data for each marked 2007 leatherback nest.

Nest Code	Turtle Id Number	Location	Fate of Nest	Incubation / days[1]	Excavated
DC0701	N/A	Zeelandia	Partly hatched	56	Yes
DC0702	WC322/WC323	Zeelandia	Nest not found[1]	N/A[1]	No
DC0703	WC324/WC325	Zeelandia	Partly hatched	60	Yes
DC0704	WC322/WC323	Zeelandia	Nest not found[1]	N/A[1]	No
DC0705	WC318/WC319	Zeelandia	Failure	N/A[1]	Yes

The survival of nests varied but overall was not very high. All nests were laid on Zeelandia Beach; five nests hatched or partly hatched leaving one that was washed away by the tide (CM0705), two that could not be located and three that failed to hatch.

Evidence of hatching was only observed for the five mentioned marked nests; three green nests and two leatherback nests. This was either hatching tracks in the sand or hatchlings encountered on the beach, and therefore it was only possible to calculate the incubation period for these nests. For both leatherbacks and greens, incubation period was determined from multiple nests; 58 days and 55.25 days, respectively.

Excavations were conducted on three leatherbacks, four greens and a hawksbill nest. Three nests, two leatherbacks, and a green, could not be found; on some occasions the nest was marked after the turtle had left the beach, and an approximate location of the egg chamber was known. For all of these nests no signs of hatching were observed, thus exacerbating this lack of information about the exact location

1 "N/A" indicates that the data of incubation was unknown either due to an unknown nesting date or the clutch did not hatch for several reasons described in "Fate of Nest".

of the eggs Only when this procedure had been performed, and no eggs were encountered, was the attempt abandoned and the nest classified as "Could not find".

Table 6. Summary of nest survival data for each marked nest of hard shell species.

Nest Code	Turtle ID Number	Location	Fate of Nest	Incubation / days[1]	Nest Excavated
CM0701R	Unknown[2]	Zeelandia	Partly Hatched	57	Yes
CM0702R	WE24/WE25	Zeelandia	Partly Hatched	50	Yes
CM0703R	WE24/WE25	Zeelandia	Failure	Unknown[1]	Yes
CM0704	Unknown[2]	Zeelandia	Hatched	52	Yes
CM0705	Unknown[2]	Zeelandia	Failure[1]	Unknown[1]	No
EI0701R	Unknown[2]	Zeelandia	Failure	N/A[4]	Yes
EI0702R	Unknown[2]	Zeelandia	Partly Hatched[4]	47	No

The excavation data from all marked nests are detailed in Appendix 4 with some of the data summarised. The depth of nests differed considerably between the three species, with leatherbacks digging deeper nests than either greens or hawksbills; mean depth to bottom of egg chamber was 64.67cm compared to 55.25 cm for greens and 53cm for hawksbills. On average, green turtle nests are 55cm and an average leatherback digs to an average of 60 cm. Leatherbacks laid much fewer yolked eggs per nest than greens or hawksbills; range was 54 – 79 for leatherbacks, 123 – 139 for greens and 139 for hawksbills. Mean number of eggs per nest for each species was 66 eggs for leatherbacks, 130 for greens and 139 for hawksbills, although the sample size for the Hawksbill species is incomplete as one nest was not found, there remained unexcavated. Hatchlings were observed by locals on a day the Co-ordinator was unavailable. EI0702R was searched for a period 11 days but unable to be located.

Table 7. Summary of excavation data from 2007

Species	Mean Depth to Bottom/cm	Mean # Eggs / Nest	Mean % Hatching	Mean % Emergence
Leatherback	64.67	66 + 30.67[3]	21.16	64.58
Green	53.25	130+0.25[1]	33.84	57.18

[1] "Unknown" indicates that no signs of hatching were observed. Also the hatching date was unknown, so it was impossible to calculate an incubation period.

[2] Turtle not observed and so identity and tagging information was unknown.

[3] Yolkless eggs

[4] A nest could not be found during excavation, therefore it was infeasible to determine the incubation period.

Hawksbill	53	133	0.0^2	0.0^2

The three species showed great variability in both hatching and emerging success; hatching success was calculated as the number of hatchlings that made it out of the shell into the egg chamber; emerging success was the number of hatchlings that made it out of the nest. Leatherbacks showed identical hatching and emerging success rate from 2006; 21.16% hatching success compared to 21.1%, but higher emerging success of 64.58% to just 15.3% in 2006. Two leatherback nests were completely unhatched. Greens were more successful in 2006 in hatching success was 33.84% compared to 51.0% in 2006, but emerging success was 57.18% in 2007 and 46.4% for 2006.

When unhatched eggs were opened it was found that leatherbacks had fewer eggs with no visible embryo present; these eggs were assumed not to have been fertilised properly and no embryo developed. The mean percentage of eggs with no embryo for each species was 66.1% for leatherbacks, 63.4% for greens.

Several nests contained pipped eggs; 1 leatherback and 123 green eggs, with a total of 124 eggs, 2 of which were dead. Very few eggs showed signs of predation; only 24 in totals and it impossible to determine the type of predator. Deformed embryos were rare; three hatchlings from nest CM0701R had deformed carapaces.

Five nests were relocated, due to the likelihood of it being washed away if left in place; two hawksbill and three green turtles. All nests that were relocated were laid in an area previously thought to be safe but as the beach profile and high tide line changed, the area was no longer deemed safe. All nests were relocated between stakes 2-3 or stakes 6-7. One green nest was washed away. All hawksbill nests were relocated due to possible runoff from nearby cliffs or high tide areas. Most nests were relocated during a night patrol as the egg clutches were being eroded by waves.

In-Water Turtle Sightings

The In-Water Survey and Monitoring project was initiated in January 2007 to provide fundamental data on the populations and trends of resident and migrant turtle species that use the surrounding waters of St. Eustatius. The information gathered is used to monitor, detect trends and assess the habitats where turtles rest, nest and feed. The majority of the marine turtle research is focused on nesting females and little is known regarding resident turtles that occupy the St. Eustatius Marine Park.

The in-water survey and monitoring will build on existing anecdotal knowledge of the population demographics of marine turtles in the St Eustatius Marine Park. The project will determine population abundance, trends and threats to the population. There are two phases to this project; one is the mapping of the underground topography of the Marine Park and the other is the population assessment of sea turtles within St. Eustatius Marine Park. These two phases do not run independently of each other, and can ideally be executed concurrently with each other. In addition to the in-water survey, the habitat of the Marine Park will also be documented to determine if and where aggregations of turtles occur. The underwater mapping of the Marine Park, also called benthic mapping, will consist of the first phase of the project. The benthic mapping will give an idea to the habitats that turtles may utilize and perhaps determine where they spend their time foraging, resting or mating. The second stage of

this project is the actual in-water survey of the population found in the Marine Park. The second phase will assess the population and abundance of turtles inhabiting the Marine Park. Individual sea turtles will be counted in a transect survey and information will be taken from each sighted turtle.

Equipment such as ArcGIS 9.0 Software and Satellite Imagery was purchased to begin the habitat mapping of the areas where resident turtles may reside. Fifty eight 58 dives have been performed and over eight individual turtles have been sighted and recorded during the Habitat Mapping Phase of the Project

In-water turtle sights were still lightly conducted. A revised form was introduced and distributed to the local dive centres; Dive Statia, ScubAqua and Golden Rock Dive Centre. The form included the Dive Master as the primary contact point. The reason for this was that diver might be less experienced in accurately identifying a turtle underwater and so more prone to error. The rest of the basic data (condition of turtle, where it was seen, etc.) remained unchanged from 2006 (See Appendix 2).

Turtle Strandings

On 29 April, 2007, a dead leatherback turtle was encountered by the Marine Park intern, Mirella Wognum, on Zeelandia Beach during a morning track survey at approximately 8:15. Lacking the necessary equipment to perform a necropsy the turtle was moved above the surf line, to ensure that it was not swept away by the tide. Later that day the remains of the turtle washed northward to stake number 1. The Programme Co-ordinator, , assisted by Marine Park interns Liz Hartel and Mirella Wognum, returned and performed a rudimentary necropsy to try and determine the cause of death. (See Photos at Appendix 12)

- The Programme Co-ordinator was not able to conduct a necropsy; No plastron or many internal organs were observed. It was possibly eaten by marine animals. Parts of the lungs were observed.
- Both kidneys were observed and fully intact.
- Carapace length was 144cm and the carapace width was 106.4 (noted that part of area carapace normally measured had been eaten). There was no plastron length attempted since there was no plastron.
- The reproductive organs showed her to be female. Furthermore, she was a breeding adult Female. This leatherback was observed nesting on 19 April 2007. She was identified by barnacle on top of her left middle carapace.
- Fresh wounds were present all around the remaining part of shell. Numerous bite marks ranging from 24 - 43 cm diameter were apparent, some being possible teeth marks. Photos were taken.
- Unfortunately no definitive answer as to the cause of death was determined from the necropsy.

On the 7th of November, a stranded Green Turtle was discovered by a local diver, Derrick Goudrian, in Oranje Bay nearby dive site Blue Bead Hole. Mr. Goudrian presented the deceased turtle to STENAPA staff which took photos and buried the juvenile Green nearby Zeelandia beach. Unfortunately the Programme Coordinator was away on holiday and unable to perform a necropsy. (See Photos at Appendix 12)

Bycatch Turtle

On the morning of 16th of May, STENAPA staff came across a drowned Hawksbill on the City Harbor. The juvenile hawksbill had been trapped in the net of a local fisherman and could not free itself from the nets, subsequently drowning.

The hawksbill that was found last Wednesday was commonly seen in Statian waters and considered a resident of the local waters. It had been measured at no more than 50 cm. It could not be determined how long the turtle was trapped in the net, but STENAPA staff determined that the turtle drowned before they reached it and had an opportunity to free it. The fisherman had no knowledge of its incidental capture. (See Photos at Appendix 12)

Sea Turtle Satellite Tracking Project 2007

The following is a summary of the research activities that were conducted as part of the Sea Turtle Satellite Tracking Project 2007.

Research Activities

A short training session on the methods for applying the transmitters was given to the Programme Co-ordinator, and turtle intern in July and another in August. Dr Emma Harrison. In 2005, Dr Robert van Dam left instructions on equipment to purchase and the design of a wooden holding box that was to be constructed. These materials were purchased in August. The preliminary schedule for attachment was organised for the month of September; with an initial plan for the final transmitter to be deployed.

'Track' the Green turtle

On Saturday 1 September 2007, a green turtle arrived on Zeelandia Beach at 11:27pm.. This turtle has been recorded on Statia for the last five years and had already come up to nest four times during the 2007 season. She was previously recorded in 2002 and in 2005. The Green Turtle, named "Track", attempted to nest but found the area she chose too rocky. On her way back to the water she was placed in a turtle holding pen where her head was covered to reduce the stress of the procedure. The satellite transmitter was activated at 12:11am as the work to attach the transmitter began. After all the work was completed (fiberglass dried and tested), she was released back into the ocean at 3:20 am, Sunday the 2nd of September.

"Track" is an average sized green turtle with a carapace length of 1.12 meters and width of 1.07 meters. She has flipper tags that show she was previously tagged by the STENAPA turtle project. This basic information is easily collected and compiled in the National Parks office. The satellite will give more detailed information that could have never been collected without the help and funding of DCNA (Dutch Caribbean Nature Alliance).

This turtle was using Zeelandia Beach as her home base for the nesting phase of her life. This makes the data being collected more valuable to see what waters she frequents for other periods of the year. The point of the sea turtle tracking is exactly this - where are these turtles when not nesting Green turtles lay an average of five nests per season and she only has four confirmed nests for the term

All STENAPA volunteers and interns, along with Arturo Herrera, Marine Turtle Programme

Coordinator, as well as several local residents were present for this major event. The entire process was videotaped by Dwight Barran and aired on Government Channel 15 on 6 September from 7:30 to 8:00pm.

Track made a brief stop at Prickly Pear Island in the British Virgin Islands in mid-September. Track then skimmed the northern coast of Puerto Rico and stopped off the northeastern coast of Dominican Republic. Track has covered over 605 km in two weeks, averaging over 43 km per day to reach suitable feeding grounds. Track is still at her foraging grounds near the coastal town of El Macao, Santo Domingo. Track is approximately 586 kilometers from her nesting areas and since acquiring her transmitter in early September, traveling a total of 2238 kilometers.

STENAPA has been in contact with Yolanda Leon, a known turtle biologist from the Dominican Republic. Ms Leon states that there are many beaches in the area where Track is located. It appears that Track is currently entering an area of intense tourism development along the beach, however, there are nearby areas with less developed beaches and offshore sea grass. One particular beach in this area was a historically important leatherback nesting beach. Track's satellite transmitter stopped signaling on 23 December 2007 but returned to signal again in early January 2008.

Beach Erosion

Of 52 stakes that had been placed in 2006, approximately 31 still remained at the start of 2006; 21 had been lost in total as stake # 47 was found later. The stakes that needs to be replaced were mostly south of Smith's Gut (Stakes 54-63 minus 55 and Stakes 43-49). For the remaining 31 the distance between the stake and the cliff was measured as an indicator of cliff erosion along Zeelandia Beach. A new method of beach mapping and erosion was implemented in 2006 and continued in 2007. Figures were compared from information taken February 2007 to figures collected in early December 2007. Nineteen stakes were in exactly the same location as February to May 2007 suggesting minimal cliff erosion for that period. In total, 18 (28.13%) stakes had a positional change of 50cm or less from their final location; 26 stakes displayed cliff erosion of 50 - 100cm from the December location (46.3%); 19 (29.79%) recorded over 1m of cliff erosion since the December mapping. Of these 19, two (3.13%) was recorded 2m in front of where it had been previously. The mean distance between the stake and the cliff was 0.87m; the range was 0.00 m – 4.51 m. Erosion was concentrated in several areas; from stakes 13-39 and between stakes 46 - 53. The first of these areas is close to the public access at the northern end of Zeelandia and the other is about half-way along the beach, past Smith's Gut. Although the data does not suggest the dramatic cliff erosion there was between 2004 and 2005, the data does indicate accelerating steady erosion. Preliminary data still needs multiple year analyses before any tangible conclusions can be made.

During 2007, 23 cliff falls were observed on Zeelandia Beach. Seven were considered major (more than five in diameter) while the rest were minor cliff falls. Observed evidence shows that the major cliff falls occurred in the ending phase of the nesting season, six in August, two in September and two in October. Nine occurred just north and south of Smith's Gut and the largest of the cliff falls occurred in this area which made negotiating these areas during night patrols difficult, especially when coupled with the nightly tides.

On five occasions the section of cliff which fell was equal or more than 10m in length; the largest (recorded on 29 October) was approximately 22 metres long and extended to the high tide line 18 metres away. A very large section of the cliff, consisting of boulders and small rocks, was found to

have fallen between markers 49 and 62 (covering 50 and 51) on 8 May and was 26 metres by 8 metres in dimension. Another cliff fall recorded on 23 April was 13 by 6 metres. During the month of February, two separate falls were recorded, all regarded as minor and ranging between one to three meters. The last two cliff falls occurred during the last week of the year. One was on Boxing Day and was approximately 14 by 10 meters between markers 35 to 37 and the final cliff fall was on 31 December 2007 and was 20 by 12 metres in diameter.

Zeelandia Beautification Project

The main objectives of the Zeelandia beautification project are multi-faceted. The primary objective is to offer an area on Zeelandia Beach where visitors can enjoy Zeelandia Beach. Another objective is to deter vehicles from driving on the beach, stop sand mining and prevent further erosion. Both of these issues go hand in hand. In June 2007, the Zeelandia beautification project commenced. On 15 June 2007, a visitor information board was installed at the primary entrance to Zeelandia Beach. 20 July 2007 was dedicated to the installation of plants and fencing at the prime Zeelandia entrances. On 7 September 2007, another Family Friday was dedicated to replanting of palm trees and yucca plants that succumbed to the warm weather.

The main short-term goals for the signs and transplanting plants at the entrances to Zeelandia beach are to provide an information focal point and improve the visual appeal of the entrance while preventing vehicles from driving on the beach. The placement of the signs will give the beautification process key points to work around

Figure 11: One of three Zeelandia Beach Signs installed

The longevity of the plants, however, is uncertain. Since 12 July, 70 different plants from six different species of palms, succulents and groundcover have been placed in the ground on the slopes around the entrances to Zeelandia beach. The different plants provide shade, erosion control and designation of the paths. The most plentiful of the plants were the coconut palms, all 25 of them donated by Daniel Eaton. All other plants were grown at the Botanical Garden. The plants are still very young and need to be protected; hence the fence surrounding them until they are large enough to fend for themselves. Boulders could be beneficial to the project if they could be moved from their current resting site onto the beach. These rocks would need to be large enough that they could not be washed away in a sudden rainstorm while providing a natural repellent in which cars could not drive over them or people could not remove them. The boulders would be far superior in terms of visual appeal to fencing and less dangerous to pedestrians

Community Outreach Events

School Activities

In 2005 the "Help Out or Sea Turtles Miss Out" programme, teaching the local communities about sea turtle conservation issues, with Education Officer Dominique Vissenburg, was particularly successful. In 2006/7, the year the focus of the school education programme was water. This curriculum did not focus on marine turtles.

"Day in the Life of A Turtle" and "Marine Turtle and Their Homes" Competitions

In concurrence with attaching the final satellite transmitter to "Track", a nesting green female turtle, the Marine Turtle Coordinator visited all island schools to give presentation to all students. The motive was to inform the local students of two different competitions relating to this project. The competitions were designed to make students think about where the turtles may go during their migration to feeding grounds and dangers they may face.

The first of these was the "Day In The Life Of A Turtle" essay competition. The concept was for students to write an essay, no more than two pages, discussing the day in the life of a marine turtle. The purpose was to describe what sea turtles do and where they go. This competition was geared towards students Grade 6 or higher. The "Marine Turtles and Their Homes" Art Competition was for children below Grade 6 level. The idea behind this competition was for students to produce a piece of art depicting a turtle in its marine habitat, or home.

The winner of the Art Competition was Lenaria Brown, aged 8, while Faraha Ishmael, age 15, won the Essay competition. Lenaria Brown, a student of the Golden Rock School, produced a very detailed clay model of a seashore depicting a nesting turtle with a satellite transmitter returning to the ocean, hatchlings emerging from their eggs and some hatchlings struggling to reach the sea. Miss Faraha Ishmael, a student at the Statia Terminals School, composed an essay on which kind of turtle she would like to be and what she would see on her voyage from St. Eustatius to her feeding grounds. Lenaria Brown's artwork was selected out of 22 quality entries while Faraha's essay was chosen out of 10 entries. Ms. Lenaria and Ms. Faraha both won free participation at the Marine Park Snorkel Club, a Marine Turtle Program T-Shirt and a turtle Necklace. Entries from Ninoushka Busby and Teagan Stewart were also highly commended.

STENAPA SUMMER CLUB 2007

During the month of July 2007, St Eustatius National Parks (STENAPA) started its inaugural STENAPA Summer Club. Twenty-four children aged eight to 13 signed up for the club which included hiking, snorkeling and turtle education activities. The Summer Club encouraged local children to be more active, while learning more about some of the plants, animals and marine life that can be found on their island. STENAPA's Summer Club ran from 2 July to 2 August every Monday, Wednesday and Thursday. The turtle camp phase was conducted every Wednesday and Thursday. The first week was a PowerPoint presentation on Marine Turtles. Sea Turtle Journals were created to record facts interesting to the participants as well as Turtle Name Tags. The second week focused on nesting behavior and identifying turtle tracks. Students learned how sea turtles nested and details of the hatching process. On the third week, students learned of the many natural predators sea turtles face during different life stages, how weather and erosion can destroy nests and how natural nests may affect survival. Games such as a food game web were applied to make connections and explain cause-and-effect relationship between sea turtles, their predators and the environment around them. In the

fourth week, students learned how humans impact turtles in the Caribbean, negatively or positively. Games such as THREATS (version of Sea Turtle BINGO) and Sea Turtle Jeopardy illustrated how people of all ages can participate meaningfully in sea turtle conservation.

Each child received a free Stenapa t-shirt and snorkeling equipment. Participation in the club was higher than expected thanks to financial support from John and Danielle Wiginton of Vecenergy Resources, who felt the course was a great incentive and agreed to sponsor up to 30 children.

- During July 2007, STENAPA started its inaugural STENAPA Summer Club. Thirty children aged eight to 13 signed up for the club which included hiking, snorkeling and turtle education activities. STENAPA's Summer Club ran from 2 July to 2 August every Monday, Wednesday and Thursday.

School Vacation Programme

This programme was implemented by the Island Government in 2004; recent graduates, who are continuing their studies overseas, are given work placements with local businesses during their summer vacation. In 2007, Jonathon Rogers participated for the month of November. He was not involved directly with the Turtle Conservation Programme.

Beach Clean-Ups

Twelve beach clean-ups were organised during the 2007 turtle nesting season; every month except for the month of May and November. Some beach clean-ups were conducted on the weekends to draw assistance from the local community. The response from the local community has improved from 2006; in the twelve clean-ups that were organised, local volunteers participated in three cleanups.

On 30 June, BroadReach, along with STENAPA staff, interns, volunteers and three members of the public joined together in a collaborative effort to clean up Zeelandia Beach. BroadReach is a volunteer organization that sails around the Caribbean and offers summer adventures for teenagers, including scuba, sailing, marine biology, academic and wilderness programs that span the globe. Furthermore, the BroadReach group provides opportunities for these teenagers to learn new skills while providing a valuable community services such as beach cleanups, trail building, road clearing and neighborhood cleanup beautification projects.

On Saturday, 15 September 2007, 22 volunteers gathered on Zeelandia Beach to participate in the largest singular most successful worldwide volunteer movement, the International Coastal Cleanup. This particular beach clean up was unique because it was the first time St. Eustatius National Parks, STENAPA, collaborated with The Ocean Conservancy on this event. Over 75 kilograms of debris was collected and removed from the beach. The volunteers included at least three Statia Terminal employees, several St. Eustatius Medical School students, concerned Statian citizens and STENAPA staff and interns. Flyers were distributed in local stores around the island to involve the local community with this cleanup. The ICC is the single largest one day cleanup event in the USA, and possibly the world. These cleanups occur in 56 countries and over 50 U.S. states and territories. It is hoped that Statia will be able to attract more volunteers for next year and have a larger impact.

Media Exposure and Public Presentations

To ensure that the Sea Turtle Conservation Programme reaches as wide an audience as possible, the Programme Co-ordinator maintained regular exposure in the press and on local radio. Many press releases were published during 2007. A total of nineteen media articles were submitted and published in the Daily Herald. The topics ranged from the two 2006 satellite tracked turtles, Lisa and Grace, to their respective foraging grounds, the start of the nesting season, stranded turtles, hatchlings, International Coastal Cleanup and the start of the 2007 satellite tracking project (See Appendix 9).

The Marine Turtle Programme was also featured in several monthly radio interviews on the programme ”Nature on Statia”. In May, the death of the two turtles (stranded leatherback and bycatch hawksbill) that occurred was mentioned. In addition, there was an update on Grace, the green turtle. In June, the Turtle Co-ordinator was on the radio to provide and update of the turtle programme In July, the host mentioned the first hawksbill nest, signaling the start of the second group of nesting turtles. In September, the radio program featured an interview with Turtle program coordinator Mr. Arturo Herrera and Zoe Fukui, Turtle Programme intern. The interview went into detail regarding the Turtle Programme, daily duties, rules and regulations of the nesting beaches, the start of the in-water monitoring program, Summer Club and results thus far.

To maximise the exposure that the St. Eustatius Turtle Programme receives internationally as well as locally, the STENAPA newsletter also featured an articles about turtles in every edition in 2007 (See Appendix 12). This quarterly newsletter is sent electronically to interested parties and ex-volunteers. The STENAPA website (http://www.statiapark.org) has several pages dedicated to the St. Eustatius Turtle Programme activities which are updated regularly. Not only do the web pages focus on the Conservation Programme, but the site also has several pages dedicated to the Sea Turtle Satellite Tracking Project in 2007 with links to location maps on http://www.seaturtle.org.

In a new phase of media exposure, the television medium was used by STENAPA to air itself in local channel 15, a government education services channel. In June a exhumation was recorded and shown on 20 June. In July, local cameraman Dwight Barran filmed a necropsy of a stranded Leatherback turtle found on 29 April 2007. This TV documentary was not aired until 15 July 2007 and featured baby hatchlings of the stranded leatherback being released on 19 June 2007. In addition to the hatchling release, the satellite transmitter attachment of Track was also videotaped by Mr. Barran. This occasion was of significant importance since it was the final transmitter and the opportunity did not go to waste. The episode aired on 6 September 2007 from 7:30 to 8:00pm. Mr. Barran presented the Turtle Programme with a DVD copy of the documentary in addition to the July hatchling release DVD. A 22 minute documentary about the activities of St Eustatius National Parks was recorded between September and October 2007, and launched on local Cable TV Channel during the week of the Marine Park 10 year anniversary. The documentary featured interviews with the Sea Turtle Coordinator, Sea Turtle intern and activities such as nesting turtle, hatchlings emerging and the September monthly beach clean-up.

In 5 December, in conjunction, with the St. Eustatius Marine Park 10 year anniversary, a one hour seminar was given on the Biology, Ecology and History of Turtles in St. Eustatius Marine Park.

Viewing of Nesting Turtles and Hatchling Releases

A new approach was taken for the upcoming season in generating interest from the local population of St. Eustatius. The Marine Turtle Program Co-ordinator spoke with several interested members who were keen to view the nesting activity of a turtle, nest exhumation or a hatchling release. The new approach took on a life of its own and has given a different perspective on turtles on St Eustatius while giving the local community a first hand glimpse of nesting turtles or hatchlings.

On 10 April, 2007, the first turtle observed was seen by STENAPA staff, interns and Working Abroad volunteers. Furthermore, several members of the St. Eustatius Medical School and local residents witnessed the nesting process of a leatherback turtle. The second observed turtle was witnessed by members of the STENAPA Board, owners of two local Dive Centres, four Divemasters of these Dive Centres and several interested members of the public. There were approximately, 15 members present. The third nesting female was observed by a wide range of people, including STENAPA staff, STENAPA interns, roughly 12 students of the St. Eustatius Medical School, the St. Eustatius Police Korps and concerned members of the local population. The third viewing had approximately 30 members to view the nesting turtle. There were approximately, 60 members who witnessed the nesting activity of a marine turtle during the 2nd quarter. On Track's satellite transmitter attachment, all STENAPA volunteers and interns, along with as well as several local residents were present. The entire process was videotaped by local cameraman Dwight Barran.

There were two hatchling releases in the 2nd quarter of 2007. On 25 May, approximately thirty individuals witnessed the release of 20 hatchlings. Furthermore, on 19 June, about 50 people witnessed the release of 10 hatchlings. In September, Green hatchlings were exhumed and there were approximately 15 people present such as local citizens, two Divemasters from Golden Rock Dive Centre and tourists from Holland. Those who came out throughout the year included members of the Statia Police, Dwight Barran who filmed the scene, local Divemaster and head of the Fisherman's Association, Renaldo Redan, STENAPA's Junior Ranger Graduates, members of the St Eustatius Medical School and Dutch tourists.

Over 170 members of the public ranging from tourists, STENAPA staff, interns and volunteers, the local police and interested members of the community viewed a hatchling release, a nesting female or both during the 2007 season.

Participation in Meetings, Workshops and Symposia

2007 Annual International Sea Turtle Symposium

The Marine Turtle Programme Co-ordinator, Arturo Herrera, attended the 27th International Symposium on Sea Turtle Biology and Conservation on behalf of STENAPA. The symposium was held in Myrtle Beach, South Carolina Kingston Plantation Embassy Suites from 22 - 28 February 2007.

The Sea Turtle Symposium began with a plenary session on sea turtles in the Carolinas. These two sessions displayed nearly 400 outstanding oral and poster presentations on a wide variety of topics related to marine turtles. It was thought that over 1000 sea turtle biologists from 47 different countries participated in the symposium.

Arturo Herrera also took part in the Annual General Meeting of WIDECAST (the Wider Caribbean Sea Turtle Conservation Network), prior to the main symposium. This meeting, which lasted from the 23rd to the 24th of February, brought together all those in the WIDECAST organization involved in turtle research and conservation within the region, to discuss topics that have specific bearing on turtles in the Caribbean. The symposium, but especially the WIDECAST meeting was an ideal opportunity to forge relationships with other turtle projects, establishing a valuable network of contacts for future reference. There was also the chance to broadcast the findings of the St Eustatius Sea Turtle Conservation and Monitoring Programme to interested parties, and to seek guidance about on-going research projects from experienced sea turtle biologists. Arturo also presented the 2006 Annual Report for St. Eustatius and 2006 DCNA Satellite Tracking Report to Dr. Karen Eckert. Furthermore, an announcement was made for a possibility of an intern to further develop the fisheries baseline study. Also, the invitation was extended of University of Exeter students via Dr. Brendan Godley

The logo for the 27th Annual Symposium incorporated the tracks of more than 700 individual turtles and the combined work of hundreds of people and more than 40 organizations. This incredible effort highlighted some amazing work, identified remaining gaps in knowledge and provided a glimpse at the possibilities that arise when we all work together.

The ISTS ended with a focus on sea turtle movement which investigated a critical look at the methods used and what we have learned about the how, what and why of where sea turtles go. On the 27th, there was a plenary session for the Conservation of Migratory Vertebrates sponsored by Inter-Research. A number of experts in the tracking of a variety of migratory marine vertebrates provided relevant background and insights from their own taxa.

These meetings were very productive with respect to making contact with other turtle biologists in the Caribbean region. Many regional turtle conservation and monitoring projects were present. Establishing links with neighbouring islands, and other Dutch Caribbean islands, was one of the objectives of participating at the WIDECAST meeting. Mr. Herrera agreed to participate in the pilot testing of the OBIS-SEAMAP website/database created at Duke University and spearheaded by Wendy Dow (see section below). Attendance at local, regional and international meetings, symposia and conferences is important for the continuing success of the St Eustatius Turtle Programme. Such gatherings provide a forum in which to broadcast the work being done by STENAPA with regard to turtle conservation on the island, while also facilitating links with other sea turtle researchers that may be beneficial in the future. The Annual Symposium on Sea Turtle Biology and Conservation is the largest of these meetings within the field of turtle research, and so it is important that the Coordinator of the St Eustatius programme be permitted to participate in future years.

Participation in OBIS-SEAMAP

The Marine Turtle Programme Co-ordinator, Arturo Herrera, agreed with Wendy Dow, graduate student of Duke University along with Karen Eckert, WIDCAST Director, to pilot test the OBIS-SEAMAP website for future use within WIDECAST. This event was planned, discussed and agreed on at the WIDECAST AGM. The Ocean Biogeographic Information System (OBIS), led by Andrew Read of Duke University, is a digital database of marine mammal, seabird, and sea turtle distribution and abundance. Partners with Duke include UC San Diego, University of Washington, College of the Atlantic, St. Andrews University, British Antarctic Survey, SAHFOS and NMFS Southeast Fisheries Center. The web-based system will allow the interactive display, query, and analysis of Digital

Archive in conjunction with environmental data. The data will be incorporated into OBIS-SEAMAP (Ocean Biogeographic Information System - Spatial Ecological Analysis of Mega vertebrate Populations) website http://seamap.env.duke.edu/, where researches and country coordinators will have access to a suite of online tools that will enable us to more fully utilize datasets for research and management purposes. The purpose of the OBIS-SEAMP is to facilitate the study of potential impacts on threatened species, enhance the ability to test hypothesis about biogeography and biodiversity models, support modeling efforts to predict distribution changes in response to environmental change and develop a strong public outreach component. Arturo Herrera piloted the website from May until early July and gave relevant comments and opinions to Wendy Dow.

Discussion

Pre-Season Preparations

Beach Preparation

The system of marking the primary nesting beach (Zeelandia Beach) with numbered wooden stakes remains the most cost effective method, due to the high probability of losing the markers as a result of high tides and cliff falls outside the nesting season. They are easy to replace or repaint at the start of each season. Reflective tape is very beneficial and greatly facilitates finding the stakes when measuring nests in the dark. A recommendation is to extend the markers to include all of Turtle Beach, as several turtles used that beach during the 2007 season and temporary stakes had to be positioned to mark nests.

Training of Volunteers

A review of the volunteer training materials was undertaken before the arrival of the first group of Working Abroad volunteers in March, 2007. The Programme Co-ordinator wanted to ensure that everyone involved in night patrol activities was given sufficient training in all aspects of the data collection protocols, both theoretical and practical. Additional training in tagging methods was provided for interns who were expected to lead patrols when the Programme Co-ordinator was not available. The level of training given to all volunteers was adequate for them to be able to collect the required data, as under normal circumstances they were not expected to undertake patrols without the Programme Co-ordinator or an intern present. It is suggested that the same training and orientation activities continue in 2008.

Monitoring and Research Activities

Track Surveys

In 2007 it was not always possible to conduct track surveys every morning, due to schedule conflicts and lack of personnel; however, surveys were completed for Zeelandia Beach most morning throughout the nesting season. They are an effective method for surveying nesting beaches not patrolled at night, to give an indication of spatial distribution of nesting around the island. Similar to previous years, three species of turtle were recorded nesting on St Eustatius; leatherback, green and hawksbill, no evidence of loggerhead turtles was found. Although there was an unconfirmed sighting in 2004 of a loggerhead turtle, they have not been recorded since then.

As also observed previously, Zeelandia Beach remains the primary nesting beach for all three species. In total, nests and false crawls were lower for all three species in 2007 compared to 2006; 5 leatherback nests in 2007 compared to 10 in 2006; 5 green nests in 2007, 34 green nests in 2006 and two hawksbill nests in 2007 compared to 5 in 2006. No nesting trends can be inferred from just a few years of data; given the long-term life cycle of each of the three species, continued long-term monitoring is essential before any assessments can be made about population trends on the island's nesting beaches. With the implementation of regular surveys throughout the nesting season it will be possible to start between-year comparisons in the future.

As for many locations in the Caribbean, leatherbacks on St Eustatius nest earlier than either of the hard shell species; between April and May, compared to July to November for greens and hawksbills. In 2007 leatherbacks and green turtle species were reported nesting later than in 2006; 30 days later for Green turtles and 10 days later for leatherbacks. For hawksbills, nesting in 2007 started later than 2006; 7 July in 2007 compared to 1 June 2006. Nesting terminated on 12 November, 2007 and 8 October for the 2006 season. These dates show major variation of the end of the nesting season. The start to the season may be the result of differing environmental conditions between the years; in preceding years, water temperatures in the Caribbean were higher than normal, marked by extensive coral bleaching in the region from August 2005 (Esteban, Kooistra and Caballero, 2005). With just a few years of data, however, it is difficult to determine a "normal" nesting season for St Eustatius, and so further monitoring is required to create a better evaluation.

With this in mind, it is proposed that more attention is given to morning track surveys; they should be conducted as early as possible in the day to ensure that all tracks and nests are undisturbed, and carried out as extensively as possible on all identified nesting beaches on the island. They should only be conducted by the Programme Co-ordinator or trained personnel in their absence, this reduces observer bias in the data and minimises data collection errors by untrained observers. No unidentified tracks were recorded in 2007; all tracks could be identified as a particular species, showing that sufficient training in track recognition had been received.

Beach Patrols

The 2005 expansion of the night patrol schedule to cover weekends has continued to be successful as several females were encountered on Friday and Saturday nights during the 2007 season; two leatherbacks and two green turtles where one was given a satellite transmitter. Prior to the 2005 nesting season, these turtles would not have been observed and the data assigned to "unknown" female. Nightly patrols should be continued in future nesting seasons and the marine turtle intern be given the bulk of the nightly patrols.

A lower number of turtles were encountered on night patrols in 2007 than 2006 (12 compared to 14, respectively). This indicates that slightly more nesting females emerged in 2006. The patrol schedule, of one patrol every hour between 9.00pm and 4.00am, remains feasible, and almost guarantees that any turtle nesting during the patrol period will be encountered. In 2007, the turtle encounter rate was 10.08 % of night patrols. Another suggestion is to extend the section of beach patrolled at night; although tide conditions often prohibit patrols along Turtle Beach. Whenever possible, particularly during months when green turtles and hawksbills are nesting, patrols should cover Turtle beach in addition to Zeelandia Beach.

Tagging Methods

In 2005, the tagging protocol was changed slightly from 2004; all turtles, irrespective of species, were double tagged with external flipper tags. This practice was used during 2007 and will continue to be used in the foreseeable future, complying with WIDECAST protocols. The reason is to maximise the probability of being able to positively identify the individual if she returned to nest and thus minimising the effect of tag loss. If only one flipper tag is applied, a turtle could be categorised as a new recruit in error if that tag is lost. Leatherback turtles also had one internal PIT tag inserted, in addition to the two flipper tags; to standardise the protocol, each PIT tag was placed in the right shoulder. No previously tagged leatherbacks were encountered. The green turtle had tags when first encountered; she carried flipper tags that had been originally applied on Zeelandia Beach in 2002.

As leatherback turtles are often prone to high levels of flipper tag loss it is advisable to continue the double flipper tagging protocol as well as using PIT tags which are less likely to be lost. Green turtles and hawksbills should also have two flipper tags applied, proximal to the last scale on the trailing edge of the front flippers; this tag location causes least drag and hence improved tag retention.

Only trained personnel should be allowed to apply tags, either flipper or PIT; this will usually be the Programme Co-ordinator or a STENAPA intern, preferable the Marine Turtle intern. The procedure established in 2005 to cover the nights when the Programme Co-ordinator was not scheduled for beach patrol was that the Co-ordinator would be on stand-by and could join the patrol crew to assist with tagging and data collection if they encountered a turtle. This had mixed results in 2007 and will require careful co-ordination of equipment to ensure that they are fully charged prior to the patrol. It is the recommendation that the Programme Co-ordinator to double-check the patrol equipment prior to the patrol leaving for their nightly patrols. On a number of occasions, it was noted that the patrol had not checked the patrol bag, leaving equipment, depleted equipment, or the patrol bag behind.

Carapace Measurements

The leatherbacks encountered in 2007 were smaller than those observed in 2006; mean CCL was 1.47m in 2007 compared to 1.58m in 2006 with CCW of 1.10 in 2007 to 1.14m in 2006. A similar situation was shown for green turtles; mean CCL n-t was 1.11m in 2007 compared to 2006 which was 1.07m; mean CCW measurements were 105.5 in 2007, 0.98m in 2006 and 1.00m in 2005. In 2007, only one hawksbill was measured so comparisons could not be made.

This difference may be a result of observer bias, or a genuine difference in the size of turtles observed; it will be interesting to compare these results with 2008. There was also some minor confusion by the Programme Co-ordinator as to what CCL measurements had actually been taken in 2004, compared to 2006 or 2007, as the description in the annual report did not correspond to the actual measurements taken; this could account for the quite large differences observed between the two years. Hopefully, this minor problem will be corrected in the future. Practical training with a real carapace was conducted with volunteers in 2006, to give them an indication of the position of the tape measure on the carapace during measurements. Great care must be taken when training volunteers how to take carapace measurements, as there is scope for considerable variation in the placement of the tape measure, particularly for CCW where there are no clearly defined end-points to measure between. Measurements of leatherback turtles should be taken by two people, as it is impractical for one person to reach the front and rear of the carapace. It is also important to carefully position the tape measure alongside the central ridge, not along the top of it, as these can also greatly effect measurements.

Nest Survival and Hatching Success

Nest survival was mixed for the 2007 season. As stated previously, one hawksbill nest did not survive the incubation period. The other hawksbill nest had hatchlings observed but the nest itself was not found. Leatherbacks showed identical hatching and emerging success rate from 2006 but higher emerging success than 2006. Two leatherback nests were completely unhatched. Greens were more successful in 2006 in hatching success but emerging success was higher in 2007 than 2006. In 2005, a green turtle nest was buried under a cliff fall, but in 2007 no cliff falls were culpable in the loss of any nests. Emerging success was 64.8% for leatherbacks, the highest for all species. Leatherbacks demonstrated improved in hatching success from the 2005 season of just 3.5% to 21.1% in 2006 and 21.6% in 2007. An increase in emerging success was displayed from 2.1% in the 2005 season to 15.3% in 2006 to 64.58% in 2007. Green turtle nests showed a decrease from the previous seasons, with a hatching success of 76.8% and emerging success of 70.1% in 2005, compared to 51.0% and 46.4% in 2006, and 33.84% and 57.18% in 2007, respectively.

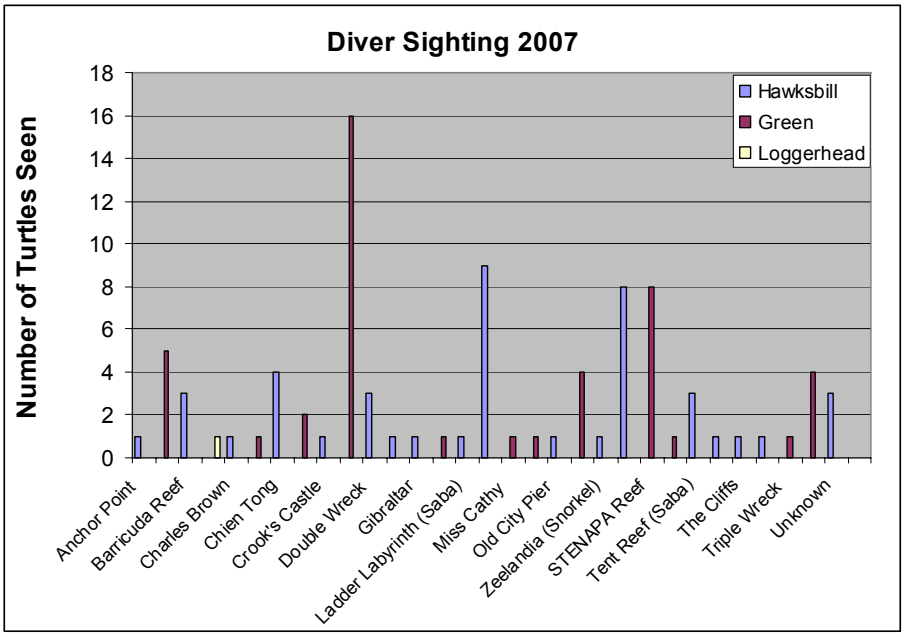
Five nests were relocated, due to the likelihood of it being washed away if left in place; two hawksbill and three green turtles. All nests that were relocated were laid in an area previously deemed safe but as the beach profile and high tide line changed, the area was no longer safe. All nests were relocated between stakes 2-3 or stakes 6-7. One green nest was washed away. All hawksbill nests were relocated due to runoff from the nearby cliff after a heavy rain causing erosion. Most nests were relocated during a night patrol as the egg clutches were being eroded by waves.

Although, emerging success improved markedly from the 2005 season, the low biomass of nests is cause for concern. Although the data indicates that the numbers are usually low, the inception of this conservation programme is relatively young and it will take several more seasons and raw data to make a more accurate assessment of the success of leatherback nests in St. Eustatius.

In-water Turtle Sightings

The In-Water Survey and Monitoring project was initiated in January 2007 to provide fundamental data on the populations and trends of resident and migrant turtle species that use the surrounding waters of St. Eustatius. The information gathered is used to monitor, detect trends and assess the habitats where turtles rest, nest and feed. The majority of the marine turtle research is focused on nesting females and little is known regarding resident turtles that occupy the St. Eustatius Marine Park. Currently, the in-water survey is underway whilst the mapping of the underwater topography has been completed and is awaiting review. It is hoped that the in-water will continue in the foreseeable future to give essential information on

The forms given to the dive centres have had a successful impact. Important information about the turtles using the near-shore waters around the island; such data collection has been incorporated into the monitoring schedule of the Programme.



It is also hoped to include dive centres on Saba, to gain data from a wider area within the Netherlands Antilles. It will be encouraging to receive support from the dive centres on St Eustatius and the support of the local community for the St. Eustatius Turtle Programme which will always be appreciated.

The raw data does point out that turtle sightings are relatively common in the waters around St Eustatius, and it is these observations that will assist to shape the in-water surveying programme in 2008. Using the data from the diver sighting forms and the ongoing in-water surveys, locations will be considered to conduct regular dive surveys to collect data on species composition, size classes and habitat utilisation.

Sea Turtle Satellite Tracking Project 2005-7

The implementation of a satellite tracking project in 2005 was a major development for the Sea Turtle Conservation Programme on St Eustatius. The tracking project was completed in 2007 and considered a success. This joint initiative with St Maarten, funded by the DCNA, was planned to not only provide information on the feeding grounds and migratory pathways of turtles that nest in the Netherlands Antilles, but also to engage the local communities on both islands in sea turtle conservation issues. The satellite tracking project was an enormous conservation, public and scientific success. It is the opinion that the satellite tracking project continue with a leatherback turtle if the funds, means and interest is available.

Beach Erosion

Erosion continued on Zeelandia Beach in 2007. An analysis was done within the year as well as year-to-year comparison. During the pre-season preparations, the numbered markers that had been lost were replaced and the distance from their 2006 location measured. Erosion was exacerbated by several large cliff falls in the beginning of the nesting season (April - July). The majority occurred in the ending phase of the nesting season, six in August, two in September, two in October and two in December. These are not only extremely hazardous to researchers (several occurred at night when beach patrols were being undertaken), but also a risk to turtles and nests close to the cliff. Nine of the 21 cliff falls was directly in front of the landfill site at Smith's Gut; heavy machinery is used to regularly compress the rubbish at the site, it is feasible that the vibrations of these machines, in conjunction with heavy rain weakening the structure of the cliff, could cause the cliff to give way.

In 2008, further detailed investigations will be conducted on the extent of beach erosion on Zeelandia Beach. The marker stakes are a useful method of rapidly assessing erosion along the cliff base. These studies will be complemented by photograph documentation of the beach, showing sand deposition and erosion during the year. The findings from these surveys will be presented in a report that will discuss rates of beach erosion in the last three years; this report should be finalised in the summer of

2008. It is also recommended that a water table survey be carried out to complement the beach erosion study.

Another compounding factor affecting beach erosion in one particular section of Zeelandia Beach is sand mining. Although illegal since 2001, it still occurs regularly, the sand being used in construction around the island. Most sand is taken from behind the beach, in a gulley that has been created from storm water run-off; this is close to the main public access at the north end of Zeelandia Beach. Some sand, however, is still being taken directly off the beach in front of the access area, as it was possible to drive a truck on the sand. Only through improved enforcement of regulations can the situation improve. Several members of STENAPA staff were sworn in as Special Agents of Police in September 2006 after completing a training course in December 2005. This status gives them authority to charge people in breach of environmental laws on St Eustatius. Hopefully with additional personnel to assist them, the police will be better able to regulate these illegal activities. A recommendation for 2008 is to monitor sand mining activities more comprehensively, especially in months outside the nesting season when it is known that STENAPA personnel are not actively patrolling Zeelandia Beach and mining has been observed to intensify.

The implementation of the Zeelandia Beach Project should continue. The second phase should be to replace the plants that have surrendered to the temperature. One suggestion is to replace some plants with species that are resistant to the salt blasts and temperatures encountered on Zeelandia. Another is the fortification of a permanent barrier to prevent entrance for trucks and recreational vehicles. Boulders could be beneficial to the project if they could be moved from their current resting site onto the beach. These rocks would need to be large enough that they would not be washed away in a sudden rainstorm while providing a natural repellent in which cars could not drive over them or people could not remove them. At most, they would have a two-foot diameter, and replace the acacia bushes that are presently protecting the yucca and agave. The boulders would be far superior in terms of visual appeal and less dangerous to pedestrians. Moving the boulders to the beach presents a logistical issue but the acquisition of them is not.

Community Outreach Events

School Activities

While the schools continued to support the Sea Turtle Conservation Programme during 2007, with the Marine Turtle Art/Essay competition, Junior Rangers, beach cleanups, STENAPA Summer Club, there is still scope for further active participation among the students. Principals and teachers were extremely supportive of all involvement with the programme, facilitating the activities whenever possible. The students all enjoyed the activities, and appear to be remembering the underlying messages being given; their knowledge of turtles, their biology, threats and the need to conserve them is vastly improving. Overall, the junior rangers learned a vast amount about the life cycle of a sea turtle and the threats that they face in each stage. Furthermore, they learned that they could make a difference in a turtle's life by not littering in the marine environment or beach and reducing possible hazards they face. By teaching the children, we hope to encourage them to become more active in environmental issues, not only currently but in the future as well.

However, it is hoped that in 2008 there will be further involvement of students in research and monitoring activities. One area that has been suggested is to take small groups of students on night patrols whenever possible; obviously this would require careful organisation, planning and

supervision, but the impact that would be achieved by having students witness a turtle nesting would be overwhelming. One possibility is to use the Junior Rangers Program as a pilot run over the course of a weekend. Another possibility is to have students participate in early morning survey patrols to search for emerging nests; this would be easier to arrange than a night-time activity, affording another opportunity to see an amazing natural phenomena as hatchlings crawl to the sea.

Engaging students in other activities, such as the monthly beach-cleans was accomplished for 2007 but this came as a personal commitment and not endorsed as a classroom activity. Following the success of the satellite tracking competitions in 2005, 2006 and 2007, it is hoped to establish an inter-school contest to see which school collects the most rubbish over the year. Perhaps this can be done on World Oceans Day or a short period of time.

Hopefully, a continued effort to teach about sea turtles will furnish students with a better awareness of the marine environment and a deeper understanding of the need to protect natural resources; it is also hoped that they will appreciate what nature has to offer in general, and how they can be personally involved in conservation initiatives on their own island.

Beach Clean-Ups

Regular monthly clean-ups of Zeelandia Beach were organised during the 2007 turtle nesting season. The majority of the rubbish collected was plastics, and household waste that had presumably come from the landfill site at Smith's Gut, although large fishing nets and lines were also encountered; these are extremely hazardous to turtles as they can easily become entangled and die.

To encourage the participation of the local community in the clean-ups in 2008, the Programme Co-ordinator is hoping to improve notification of clean-ups, possibly by publicising events in the local press or on the radio. The Co-ordinator also plans to approach large employers on the island, such as the oil terminal, to enquire about their support for such activities, by donating man-power or resources.

Additionally, the International Coastal Clean-up organised each September by the Ocean Conservancy was a great success and was well-publicised throughout the island. This global event highlights marine pollution problems, and would hopefully be a great means of generating local support for the beach clean-ups on the island. Volunteers record specific types of marine debris being found, allowing The Ocean Conservancy to compile, analyse and track this data year-by-year and make discoveries about the behaviours that cause the debris. It is proposed that the International Coastal Clean-up campaign is continued with STENAPA being the local country coordinator.

In relation to the beach clean-up activities, with respect to waste management on the island in general; it is vital to try to raise awareness in the community about recycling, reducing waste and other associated waste issues. One troublesome issue on the island is the Smith's Gut landfill site; it requires immediate and drastic attention because if an alternative solution is not found quickly it could rapidly become an uncontrollable disaster. STENAPA continues to alert the Island Government to this environmental hazard with regular letters about the landfill.

Media Exposure and Public Presentations

The St Eustatius Turtle Programme received a considerable amount of exposure in the media during 2007. In total 21 articles were published in the Daily Herald featuring leatherbacks, hatchlings, public viewing of nesting turtles, International Coastal Cleanup Day as well as regular beach cleanups,

satellite transmitter attachment and the research and monitoring activities of 2007. The numerous radio interviews and updates also gave good publicity to the programme. Additionally, the three television segments that were shown in Channel 15 during the nesting season gave an unprecedented medium that should be strongly explored for the 2008 season. This avenue would prove ideal for giving unfettered access to a nesting female and possibly spur interest for the local community (see Appendix 10).

It is important for all significant events to be broadcast to the local community, to ensure that they remain fully informed about all the work being achieved as part of the St Eustatius Turtle Programme. In addition, any activities that allow the results of the monitoring and conservation programme to be published to locally should be encouraged, such as public talks or presentations with different sectors of the community, such as church groups.

The STENAPA newsletter and website also provide the ideal forum to reach an international audience, and inform them about the work of the St Eustatius Turtle Programme; the website in particular is a great medium in which to inform the wider pubic about the work being done for sea turtle conservation on St Eustatius, as it can be regularly updated with news, research activities and data.

Participation in Meetings, Workshops and Symposia

Participation in local, regional and international events is important for the work of the Sea Turtle Conservation Programme on St Eustatius to be recognised within the wider sea turtle community.

The Annual International Sea Turtle Symposium is an ideal forum to exchange information with leading experts in all fields of sea turtle biology and conservation; the WIDECAST meetings, held at the same time as this symposium, bring together the majority of the sea turtle projects from the Caribbean. They facilitate contact with other turtle conservation and research organisations from the area, and serve as a perfect arena in which develop and maintain regional contacts. The affiliation that the St Eustatius Turtle Programme has with the WIDECAST network is a beneficial one, as it provides this small island initiative access to more established projects, who can share their experiences with developing programmes such as ours. In future it is hoped that the Programme Co-ordinator can continue to attend the symposium, and it is anticipated that, as the St Eustatius Turtle Programme develops, we will be able to present more of our research findings at this important event.

The invitation of the Programme Co-ordinator to participate in Bonaire Sea Turtle in-water capture programme was a great occasion to acquire new techniques and information beneficial the programme. Although, due to Arturo Herrera announcing his resignation in October and the invitation was in November, the invitation to represent STENAPA had to be rescinded. While it is agreed that the population of turtles nesting on the island is very small and that monitoring activities is in its infancy, it is still beneficial to gain knowledge regarding various methods of in-water capture and monitoring. Furthermore, it was another opportunity to disseminate information about the project to researchers working in the region, and important international contacts were made. It was also possible to attend an in-water tagging and capture training session in St. Kitts as well, but the start of the patrol season was a conflicting issue (April). It is the recommendation the next Programme Co-ordinator attend one of the two sessions.

Technical Reports

The writing and editing of technical reports, manuals and articles are a necessary element to the progress and establishment of the sea turtle conservation programme. In 2007, there were two reports created. In July, a sea turtle volunteer manual was created for future volunteers. The objective of this manual is to familiarize the incoming volunteers and interns on the history of St. Eustatius, the marine turtle programme and protocols of the monitoring programme. The report was created by the marine turtle intern and the 11 page manual can be found on the Turtle Programme folder of the STENNET Research directory. In early February, a habitat mapping procedure and protocol technical report was created. The objectives of this report was to give specific and general objectives of habitat mapping, methodologies, rules of habitat mapping and equipment to take while conducting a habitat mapping survey. In late November, a St. Eustatius In-Water Survey & Monitoring Project Outline technical report was written. The report underlines the objective of understanding the population dynamics of sea turtle species surrounding St. Eustatius' waters. This report was similar to the habitat mapping technical report in outline. Both report detail the objectives, methodologies, data collection, rules and equipment when undertaking this type of survey. Both reports can be found at the STENNET Research In-Water Survey directory (\\Stennet\research\Marine Park\Turtle Programme\In-Water Survey\Survey Techniques).

In late November, Marine turtle intern, Zoe "Shizu" Fukui, completed her final report which was the history of turtles in and around St. Eustatius. Her 45 page report covered many aspects including current conservation efforts, a survey of various demographic types about people's past and present feelings towards sea turtles, consumption, commercial consumption, safeguarding critical habitat, laws regarding marine turtles and potential income. Her report is currently located in the Manager's Office but will shortly be relocated to the dedicated marine turtle bookshelves.

Recommendations for 2008

Several recommendations are proposed for the St Eustatius Turtle Programme in 2008; these suggestions are given following an assessment of the achievements and deficiencies of the project in 2007. Many of these recommendations have been mentioned previously in the relevant section of the discussion; however, those that were not, which relate more to the programme in general, are listed below.

Participation of volunteers

Without the continued assistance of volunteers from these two programmes the St Eustatius Turtle Programme could not conduct its intensive research and monitoring activities. It is therefore recommended that for 2007 volunteers continue to participate in all aspects of the project; care should be taken to ensure that all volunteers receive adequate training prior to participating in any research activities. Also, local volunteers should be actively recruited and invited to participate in beach patrols or other project events, thus increasing local involvement in the programme.

Furthermore, although the nesting season was not as busy as expected, it is recommended that a dedicated Sea Turtle Intern be appointed for 2008 to aid the Programme Co-ordinator. The Sea Turtle Intern should have previous turtle experience, responsible and self-motivated.

Beach patrols

The daily monitoring of the nesting beaches should continue in 2008. The continuation of nightly patrols in 2007 proved successful, and should be maintained providing that sufficient personnel are available to assist the Programme Co-ordinator and STENAPA staff. The inclusion of a dedicated Sea Turtle intern for the nesting season should remedy the personnel situation. As mentioned above, more focus should be place on morning track surveys, especially on beaches other than Zeelandia Beach, which are not monitored at night.

Early morning patrols were performed in 2007; this is one activity that should be continued indefinitely, especially during hatchling season. It provides increased data on the hatching dates of marked nests, thus enabling the incubation period to be determined more accurately, but it is an ideal means of involving interested members of the public in research activities. In particular, students could be invited to participate in these patrols, which would be logistically much easier to organise than a night-time patrol. Patrols could be organised for days close to the predicted hatching date of a nest, especially if signs of imminent hatching have been witnessed. They also provide an excellent education opportunity; the chance to teach the public about what to do, or not to do, if they observe a turtle nest hatching.

Additionally, the protocol of the turtle truck when the Programme Co-ordinator is not patrolling is it should be with the turtle patrol. This created issues when the Co-ordinator was needed in-situ and the turtle truck was allocated to the patrol and other vehicles did not arrive in a timely manner. There were time issues in reaching the patrol when the Programme Co-ordinator was needed and had to find other means to reach the patrol. On more than one occasion the Program Co-ordinator had to ask for a ride from neighbours to reach Zeelandia. Furthermore, it was observed on several occasions that volunteers or interns were using the turtle truck for reasons not related to work or patrols or indiscriminatingly switching between trucks for their benefit. For the upcoming 2008 season, it is strongly recommended that the policy of the dedicated turtle vehicle be reviewed.

Development of the research programme

In addition to the monitoring activities conducted on the nesting beaches, the expansion of the progamme has forged to in-water surveying for the St Eustatius Turtle Programme in 2008. To date the focus has been on adult females nesting on the island's beaches; however, it is known that there are juvenile turtles using the in-shore waters within the Marine Park. An in-water survey of these turtles is underway for 2008 with the groundwork currently being laid out. The in–water monitoring programme will run indefinitely and quantify the data currently being received from divers about turtle sightings. Ideally an in-water tagging programme would be hopefully developed to monitor movement of individuals from juvenile feeding grounds to adult foraging areas; this would require extensive training on in-water methods, which would be facilitated by the closer links being developed with other turtle projects in the region. This tagging phase will not be implemented until 2009 at the earliest as in-water surveying guidelines and method becomes more established and familiar. One aspect of the in-water programme is the benthic mapping of the entire Marine Park. It is recommended that the habitat map generated in 2007 be reviewed and optimized to its fullest capacity.

Acknowledgements

The project recognises the continued assistance of STENAPA staff and board members, without whom it could not continue its research and conservation efforts.

The intensive monitoring schedule could not be accomplished without the hard work and dedication of STENAPA interns, international Working Abroad participants and local volunteers.

We received financial assistance during 2007 from the Travel Committee of the International Sea Turtle Society, USONA, Working Abroad and the World Turtle Trust; these awards and donations covered operational expenses and travel costs to participate in international meetings and symposia. .

For sharing his expertise, and providing training on satellite telemetry methods, we wish to especially thank Dr Robert van Dam, without whom the Sea Turtle Tracking Project 2007 would not have been possible.

The project also recognizes Dr Emma Harrison, previous Sea Turtle Programme Co-ordinator, for her training of satellite telemetry techniques in August as well as invaluable insight throughout the year.

For her guidance and continued support of the St Eustatius Turtle Programme in her role as WIDECAST Director, we would also like to thank Dr Karen Eckert. She was instrumental in our collaboration with Alicia B. Marin who provided us with the materials for the Sea Turtle facet of the STENAPA Summer Club.

The project recognizes Alicia B. Marin who provided us with the materials for the Sea Turtle facet of the STENAPA Summer Club.

For sponsoring Stenapa's Summer Club in July, STENAPA and the St Eustatius Turtle Programme wishes to thank Vecenergy for their support in helping make the club a success.

Special thanks to Dr Jan and Corrie van Duren, for their assistance in monitoring Kay Bay.

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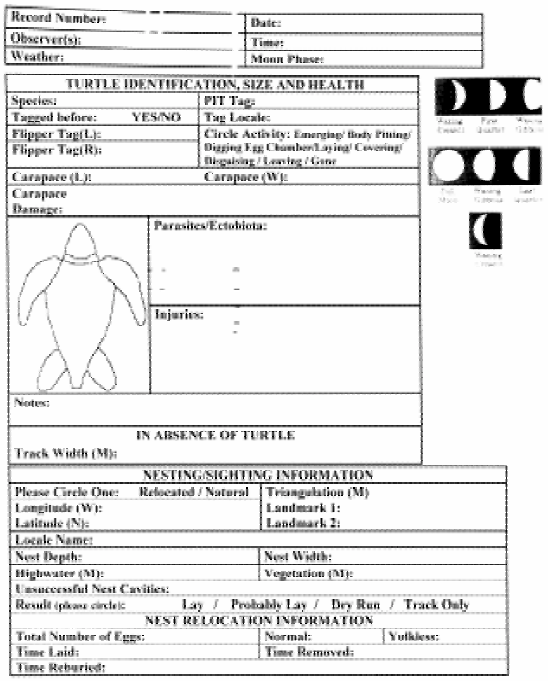
Appendices

Appendix 1

Examples of data collection sheets updated or created in 2007.

Tagging and Nest Location Data *Nest Excavation Data*

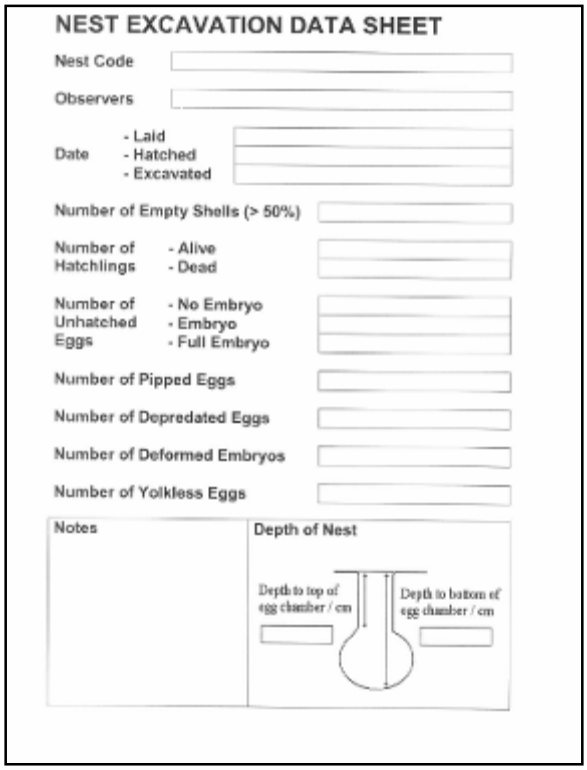


Record Number:	Date:
Observer(s):	Time:
Weather:	Moon Phase:

TURTLE IDENTIFICATION, SIZE AND HEALTH	
Species:	PIT Tag:
Tagged before: YES/NO	Tag Locale:
Flipper Tag(L):	Circle Activity: Emerging/ Body Pitting/
Flipper Tag(R):	Digging Egg Chamber/Laying/ Covering/ Degassing / Leaving / Gone
Carapace (L):	Carapace (W):
Carapace Damage:	
	Parasites/Ectobiota:
	Injuries:
Notes:	

IN ABSENCE OF TURTLE
Track Width (M):

NESTING/SIGHTING INFORMATION		
Please Circle One: Relocated / Natural	Triangulation (M)	
Longitude (W):	Landmark 1:	
Latitude (N):	Landmark 2:	
Locale Name:		
Nest Depth:	Nest Width:	
Highwater (M):	Vegetation (M):	
Unsuccessful Nest Cavities:		
Result (please circle): Lay / Probably Lay / Dry Run / Track Only		
NEST RELOCATION INFORMATION		
Total Number of Eggs:	Normal:	Yolkless:
Time Laid:	Time Removed:	
Time Reburied:		



NEST EXCAVATION DATA SHEET

Nest Code

Observers

Date - Laid / - Hatched / - Excavated

Number of Empty Shells (> 50%)

Number of Hatchlings - Alive / - Dead

Number of Unhatched Eggs - No Embryo / - Embryo / - Full Embryo

Number of Pipped Eggs

Number of Depredated Eggs

Number of Deformed Embryos

Number of Yolkless Eggs

Notes

Depth of Nest

Depth to top of egg chamber / cm

Depth to bottom of egg chamber / cm

Appendix 2

In-Water Sighting Sheet

Example of the in-water turtle sighting form given to dive centres in St Eustatius in 2007.

St Eustatius Turtle Programme
In-Water Turtle Sighting Form

Sea turtles are endangered throughout the Caribbean. This form is part of a preliminary assessment of their numbers and habitat use within Statia Marine Park. The findings will aid in the implementation of an effective conservation management strategy to ensure their future survival.

Dive Site **Dive Centre**			**Date** **Dive Master**		**Time**
Species	Green	☐	Loggerhead	☐	
	Hawksbill	☐	Leatherback	☐	
Size of turtle	< 10cm	☐	50 – 100cm	☐	
	10 – 50cm	☐	> 100cm	☐	
Did the turtle's tail extend more than 15cm beyond the shell?					
Yes ☐		No ☐		Don't know ☐	
Condition of the turtle?					
Alive ☐		Injured ☐		Dead ☐	
If injured, describe injury					
Distance from turtle	< 3m	☐	5 – 10m	☐	
	3 – 5m	☐	> 10m	☐	
Visibility?		Metres			
What depth was the turtle seen at?			Metres		
Where was the turtle?					
At surface ☐		On bottom ☐		Water column ☐	
What was the environment?					
Sand ☐	Rocks ☐	Reef ☐	Sea grass ☐	Other ☐	
What was the turtle doing?					
Resting ☐	Swimming ☐	Eating ☐	Mating ☐		
Were tags present? (Metal tags located on front flippers, close to body)					
Yes ☐		No ☐		Unsure ☐	
Other comments:					

Thank you! Please return completed form to your dive master.
For more information please contact the STENAPA office in Gallows Bay
or visit the website at www.statiapark.org

Appendix 3

Underwater Topography of St. Eustatius Marine Park

Appendix 4

Excavation data for leatherback nests

Nest Code	Hatchlings		Empty Shells	Unhatched Eggs			Pipped Eggs	Yolkless Eggs	Total Eggs	% Hatched	% Emerged	Depth[1] / cm	
	Alive	Dead		No Embryo	Embryo	Full Embryo						Top	Bottom
DC00701	0	0	22	31	11	1	0	14	65	33.85	100.00	60	70
DC0703	0	1	16	10	20	8	1	54	54	29.63	93.8	58	67
DC0705	0	09	0	79	0	0	0	24	79	00.00	00.00	37	57

Excavation data for hawksbill nests

Nest Code	Hatchlings		Empty Shells	Unhatched Eggs[2]			Pipped	Predated	Deformed	Yolkless Eggs	Total Eggs	% Hatched	% Emerged	Depth[1] /	
	Alive	Dead		NO	E	FE								Top	Bottom
EI0701R	0	0	0	128	4	0	0	1	0	0	133	0.0	0.0	45	53

[1] Depth from surface of sand to first egg (Top) and bottom of egg chamber.
[2] NO = No Embryo; E = Embryo; FE = Full Embryo.

Appendix 5 Continued

Excavation data for green turtle nests

Nest Code	Hatchlings		Empty Shells	Unhatched Eggs[1]			Pipped	Predated	Deformed	Yolkless Eggs	Total Eggs	% Hatched	% Emerged	Depth[2] /	
	Alive	Dead		NO	E	FE								Top	Bottom
CM0701R	1	3	12	38	16	49	1	21	3	0	139	8.6	66.7	36	51
CM0702R	12	1	35	20	44	55	0	0	0	1	127	27.6	62.9	37	52
CM0703R	0	0	0	131	0	0	0	0	0	0	131	0	0	31	55
CM0704	0	1	122	1	1	0	122	0	0	0	123	99.2	99.2	34	55

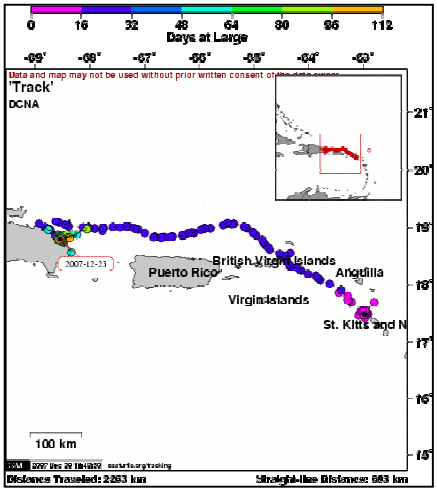
[1] NO = No Embryo; E = Embryo; FE = Full Embryo.
[2] Depth from surface of sand to first egg (Top) and bottom of egg chamber.

Appendix 6

Photos and Satellite information for Track, the green turtle

Photographs of the attachment of a satellite transmitter to a hawksbill turtle on 1 September 2007.

Map showing some of the location points received from the hawksbill turtle "Track" from St Eustatius; points show the route taken by the hawksbill after her release from Zeelandia Beach. Track's last signal was on 23-12-2007.



Appendix 7

2007Education Outreach/Environmental Education

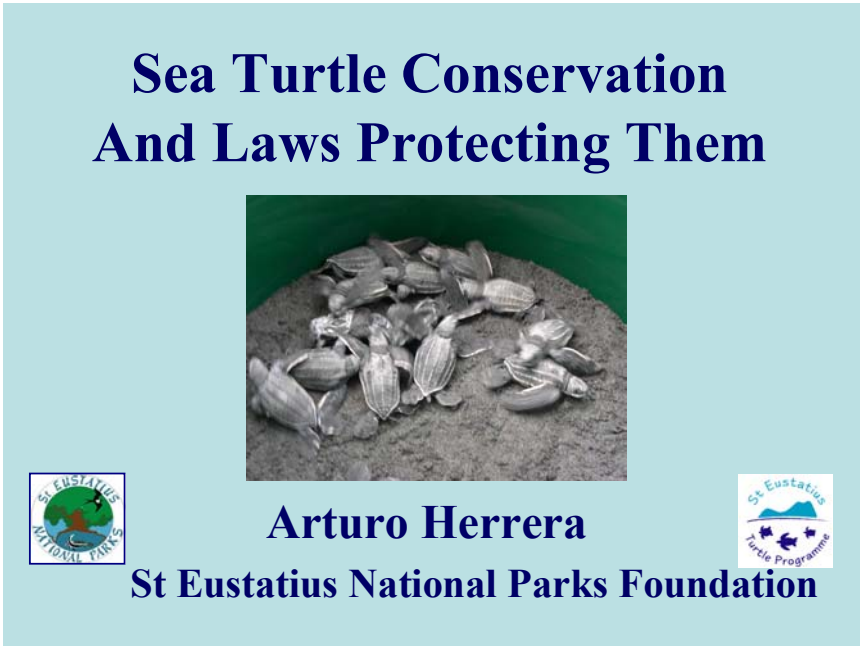


Figure 12: Presentation given to Junior Rangers

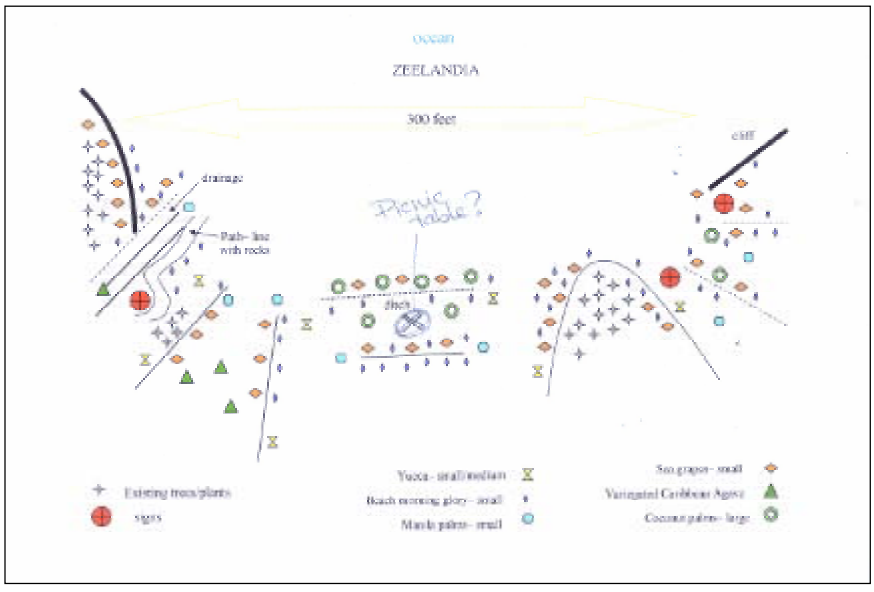
Figure 13: STENAPA Summer Club 2007

Appendix 8

Map and photos of Zeelandia Beautification Project in 2007

Figure 14: Park Ranger Gadget installing sign

Figure 15: South signs installed via interns to prevent vehicle access



Appendix 9

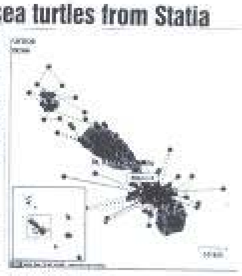
2007 Media Articles

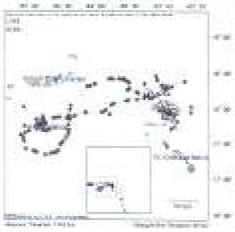
Copy of newspaper articles from the Daily Herald which features some of the topics covered during the 2007 year.

WEEKENDER

Sea Turtle Update

The adventures of two sea turtles from Statia





Monday April 2nd 2007

The Daily Herald

First turtle tracks of the season observed on Statia

ST. EUSTATIUS--In the early morning hours of Friday, March 3, a female leatherback turtle hauled herself onto Zeelandia Beach on St. Eustatius. This event signals the beginning of the nesting season for sea turtles on the island.

The turtle attempted to nest, but was apparently obstructed by vegetation and returned to the sea without laying eggs.

The tracks were seen by the beach monitoring team and confirmed to be those of a leatherback turtle by Turtle Programme Coordinator Arturo Herrera. Leatherbacks are the largest of all marine turtles and are also the oldest species now in existence. Adult males can exceed 1.8 meters in length and can weigh 2,000 pounds or more. The species is called leatherback because of the tough, oil-like, rubber-like skin it displays.

Herrera says, "It is exciting that the leatherbacks have started to arrive. Their nesting season usually begins about now and lasts until the beginning of June, while hawksbills are nesting as early as May and green turtles starting to nest in June. With the arrival of last (Thursday) night's visitor, I am hoping we can get a good start and a record number of nests for 2007."

Since the inception of beach monitoring, the nest count has slowly grown each year with the record number of nests, 55, observed in 2006. Although it takes about 15 years of data to establish a significant nesting trend, Statia has seen a slow but steady increase since 2002.

The Caribbean Sea was estimated to hold one of the largest populations of turtles in the world until the 1800s. Now, only a fraction of those populations remain. Marine turtles survived the extinction of the dinosaurs and many other prehistoric animals, but threats such as pollution, disorder by catch, being hunted for their meat and eggs, and use of their shells in ornamental products have seen their numbers dwindle worldwide.

In St. Eustatius, sand mining and beach erosion, which may be related, are thought to be responsible for a previous decline in the number of nests. In the past month, illegal sand mining has been recorded on several occasions. The penalty for illegal sand mining is a fine of NAf. 5,000, or up to two months in jail.

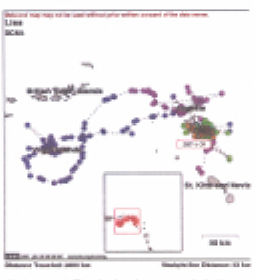
Currently, three of the seven existing sea turtle species are critically endangered, while three species are endangered. Green turtles are an endangered species, while leatherbacks and hawksbills are critically endangered.

Hee Daily Herald

Saturday february 10th 2007

Tracked Turtles from Statia are Truckin'

The continuing Hind of Lisa and Grace will reach a new milestone. The two turtles have reached an amazing three thousand kilometres since leaving Zeelandia Beach on Statia during the nesting season.



In mid-September, both turtles received their tracking satellites. Lisa, a hawksbill turtle, was fitted with a satellite transmitter on Zeelandia Beach on September 8 last year, while Grace, the green turtle, was fitted with a transmitter ten days later, September 18. To add to the excitement, two green turtles that are currently being satellite tracked from Guadeloupe were also found in the same waters. This was confirmed by Eric Delcroix, Coordinator of the Conservation Sea Turtles Programme on Guadeloupe (French West Indies).

THE TURTLES are in their respective foraging grounds for the winter. Hawksbill and green turtles can be found in tropical waters where coastal reefs, bays, estuaries and lagoons are located. Lisa is in the uninhabited islands between St. Barths and St. Maarten. She has been there since mid-October and it is thought to be an excellent feeding ground for hawksbills. The Hawksbills' staple diet is sponges. Their hawk-like beak, which their name derives from, is very powerful and lets them tear sponges as well as other marine invertebrates such as squid.

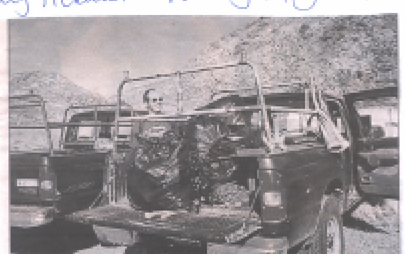
Grace has been transmitting from sea grass beds off the waters of St. Kitts and Nevis. She is also in the same foraging area as two green turtles from Guadeloupe. Coccinelle and Laeticia are turtles that were released from the French West Indies Island at the end of August 2006. Coccinelle has been tracked a total of 4,108 kilometres, while Laeticia has travelled 1,704 km. Green turtles are primarily herbivores. Young green turtles, however, have been recorded to feed on crustaceans and other invertebrates, such as jellyfish, before switching to a steady diet of sea grass later in life.

The two turtles are part of an inter-island project funded by the Dutch Caribbean Nature Alliance (DCNA), involving St. Eustatius National Park (STENAPA) and the Nature Foundation St. Maarten. The objective is to better understand where the sea turtles nesting on St. Eustatius and St Maarten travel to when they leave the eastern Caribbean. The life cycle of these species is incomplete and studies such as these are needed to identify possible hazards turtles may face by providing more information about their migration routes between different habitats. Both these species are found in the tropical waters of the Atlantic, Indian and Pacific Oceans.

These two particular species were once abundant in the Caribbean; their numbers are a fraction of what they once were, due to the poaching for their colourful shells and meat. According to the IUCN, the International Union for Conservation of Nature and Natural Resources, an analysis of historic and recent published accounts point to declines in all major ocean basins.

It is estimated that over the past three generations, hawksbill turtles have lost an estimated 80 per cent of their overall population, while green turtles have seen their numbers decline from 50 to 70 per cent during the same period. Factors such as over-exploitation of eggs, females and juveniles in foraging areas have contributed to this decline, as well as incidental mortality relating to marine fisheries and degradation of marine and nesting habitats.

The Daily Herald. Tuesday 27th Feb '07



A pick-up truck filled with garbage picked up at Zeelandia Beach

Stenapa cleans up Zeelandia Beach

ST. EUSTATIUS--To offer clean beaches to the turtles that are coming to Statia during the nesting season between March and November, St. Eustatius National Parks Foundation (Stenapa) is organizing regular clean-ups along Zeelandia Beach, as this is an important area where endangered turtles come to nest.

Leatherback turtles will be the first to nest, followed by greens and hawksbills. Sea turtles are ancient reptiles that have lived in the oceans for more than 150 million years.

Beaches need to be clean so that the hatchlings get the best chance of survival possible. Garbage left in the sea or on the beach can obstruct nesting grounds and trap emerging hatchlings.

Lights, noise, pollution, and beach driving chase sea turtles away. An area that is covered in garbage can disorient and harm the hatchlings. Turtles become caught in plastic sacks, bottles or tin cans, even pieces of rope.

Plastic sacks floating in the ocean are a huge threat to turtles as they look like their natural food: jellyfish. Almost half of the sea turtles found dead have plastic in their intestines.

Approximately 12 sacks of garbage were collected from Zeelandia Beach by Stenapa rangers Carlton van Putten, Arturo Herrera and Hannah Leslie. They were assisted by interns Liz Hartel, Vincent Kleinekorte, Lauren Maloney and Lawrence Cook, and volunteers Penny Hands, James Dawson, Jenny Blanch, Liz Baldwin, Jenny Scott, Jonathan Laill, Ann Cooper and Rosamond van der Linde from the United States. Without these "Friends of the Turtles," this clean-up effort would not have been possible.

Flyers had been placed around the island for people to assist with this clean-up. It is the intention for the schools in Statia to also become involved with joining the Stenapa rangers and interns to help with these regular clean-ups.

Appendix 9 Continued

Copy of newspaper articles from the Daily Herald which features some of the topics covered during the 2007 year.

THE DAILY HERALD, Friday, April 13, 2007

Members of the Statia Turtle Team look on as their large leatherback turtle excavates her nest

Large leatherback turtle nests on Statia

ST. EUSTATIUS–A large female leatherback turtle returned to the beach on which she was born to make a nest and lay her eggs on the night of April 10. She was observed by a small group of interested people comprising the "Turtle Team," who patrol Zeelandia Beach nightly to look for and record sea turtle nesting activity.

Among the watchers were four members of the public, five volunteers and three interns from St. Eustatius National Parks Foundation (Statenpa), one Statenpa staff member, and the Marine Turtle Programme Coordinator, Arturo Herrera.

This female turtle had never been recorded previously, as she displayed no flipper tags or other markings. She was tagged on her rear flippers so she can be identified when she returns the first time I have seen a leatherback. They do get really big!"

That turtle took just over an hour to finish excavating her nest and laying her eggs, as the onlookers got to see most of the process. This is the second known nest on Statia this year.

Herrera said, "I believe that getting the public involved is important, because there are Statia's turtles, and it is exciting that such a unique animal comes ashore on our beaches."

Further information about viewing nesting turtles or other research activities of the St. Eustatius Sea Turtle Conservation and Monitoring Programme is available at the National Park visitors centre on Gallows Bay, or one can call the coordinator at 318-2484.

Islands

THE DAILY HERALD, Monday, May 21, 2007

Dead turtles found in fisherman's nets

The dead hawksbill turtle found in Statia waters

The first baby turtle hatchlings of the year emerged from their nest on Zeelandia Beach on Friday, May 25. Marine Turtle Program Coordinator Arturo Herrera and St. Eustatius National Parks Foundation (STENAPA) intern Lauren Maloney discovered the hatchlings at approximately 7:00am, when they made their daily check of the beach.

Herrera noticed a pair of … yellow-crested night herons on an … when a leatherback had nested at the end of March. He roused the birds away, but, sadly, one of the herons had already caught a hatchling and took off with the tiny turtle in its beak. It could not be determined how many of the hatchlings had been eaten, as there were numerous tracks of both birds and baby turtles. When Herrera and Maloney arrived, there was only one hatchling left, and it was upside down. Maloney righted it and it made its way to the sea.

The team continued to watch the nest as the day progressed, and gradually a small group of onlookers gathered to see what would happen. At about 2:00pm, 10 more hatchlings emerged. Unfortunately, three of them succumbed to the heat of the afternoon.

REACTIONS among the onlookers varied, from excitement to awe as the tiny turtles dug their way out of the sand and scurried to the sea. Over 20 of them were present to witness the beginning of the hatchling's remarkable journey. STENAPA intern Lawrence Cook said he was almost moved to tears by the experience of seeing the little hatchlings.

In total, 75 hatchlings made it from Zeelandia Beach to the Atlantic, to begin their amazing voyage. Four died, including at least one taken by a bird.

Leaving the nest is a grueling activity that can take several days. The first turtles to hatch wait until more are ready to go, then they make their way out of the nest as a group, through the sand towards the sea.

HATCHLINGS avoid … by orange from their nest at night in response to nesting …

surface temperatures. These hatchlings, probably, start all moving upwards early in the evening, but by late they reached the surface, daylight had come.

Almost nothing is known about the first years of a loggerhead's life after it has left its hatchling. Those who make it to the sea often emerging from the nest are not seen again until many years later, when the adult females who have survived stand on beaches which they …

Continued on pg. …

LEATHERBACK HATCHLINGS

Continued from page 4

Many are killed, especially by humans, before they reach their age. Sometimes we do not kill them directly, but still they perish from our activities. For example, a turtle can drown when he or she becomes tangled in fishing nets. Also, turtles are very sensitive to light.

HATCHLINGS are attracted by artificial lights and may crawl inland instead of toward the sea. These hatchlings need to find the sea and often die in the morning sun. Also, turtles in the sea can mistake plastic bags for jellyfish, their natural food, and will die when these stomachs become packed with …

plastic.

As with all reptiles, it is the temperature of the eggs during incubation which decides whether the hatchling will be male or female. In the case of leatherbacks, the critical temperature seems to be just below 29 degrees centigrade. Above that temperature, there will be more females and below it, there will be more males. For this reason, the hatchlings from the top of the nest are more likely to be female, as it is hotter nearer the surface. Incubation can take from 60 to 75 days, depending upon the temperature in the nest.

Turtle enthusiast Yanni Armstead holds a tiny turtle in his hand before helping it to the sea. Armstead says he hasn't seen a baby turtle in 49 years.

Turtle Coordinator Arturo Herrera watches Jamal and his helpers usher on the baby turtles emerge from their nest.

Appendix 9 Continued

Copy of newspaper articles from the Daily Herald which features some of the topics covered during the 2007 year.

THE DAILY HERALD, Friday, June 29, 2007

STENAPA Ranger Robert holding a baby turtle

Statians witness release of sea turtle hatchlings

ST. EUSTATIUS—More than fifty curious onlookers gathered at Zeelandia Beach recently to witness the release of baby leatherback tortoises that had been spotted earlier by Marine Turtle Programme Coordinator Arturo Herrera and newly-arrived intern Shizu Fukui.

Those who came out included members of the Statia Police, Dwight Barran, who filmed the scene, local dive master and Head of the Fisherman's Association Renaldo Redan, STENAPA's Junior Ranger graduates, members of the St. Eustatius Medical School and Dutch tourists.

Fukui gave appropriate tips for viewing the hatchlings at a safe distance. She and Junior Ranger graduates released 10 healthy hatchlings into the ocean.

THE DAILY HERALD, Thursday, July 5, 2007

Stenapa, Broad Reach clean Atlantic beaches

ST. EUSTATIUS—St. Eustatius National Parks (Stenapa), Broad Reach and the general public joined together in a collaborative effort to clean up some of Statia's beaches.

Zeelandia along with Turtle Beach was made cleaner by the removal of plastic, paper, Styrofoam, diapers, and washed-up items. The motive was to offer a cleaner beach for resi-

Volunteers showing the collected garbage at one of the island's beaches

dents as well as nesting sea turtles to enjoy.

Zeelandia Beach is the primary nesting beach where critically endangered marine turtles come to nest. Leatherback, Green and Hawksbill turtles have been seen nesting on Zeelandia. Cleaner beaches provide nesting females and hatchlings with a better chance of survival. Garbage left at the sea or on the beach can obstruct nesting grounds and trap emerging hatchlings. Plastics are also a threat as they look like the leatherback's favourite food: jellyfish. Over half of the sea turtles found dead have plastics found in their intestines.

Over 30 people worked vigorously Saturday for almost two hours to make the Atlantic beach as a clean and cleaner place. Over three truckloads were hauled away, including a broken buoy and several tires.

In addition to Stenapa staff, interns and volunteers, over twenty Broad Reach members participated in the clean-up and three members of the public, including a four-month-old baby.

Later this month, Broad Reach groups will also help improve Crocker Mountain trail and clear the Cerrillos from the Quill entrance trail and from the Botanical Garden.

The Broad Reach group comprises mostly US teenagers who sail around the Caribbean and offer summer adventures, including scuba, sailing, marine biology, and academic and wilderness programmes that span the globe.

Furthermore, Broad Reach provides opportunities for these teenagers to learn new skills while providing a valuable community service such as beach clean-ups, trail building, road clearing and neighborhood clean-up beautification projects.

Nicole Esteban of Stenapa said that foundations interested in having the Broad Reach student's help on a project this month should contact the National Park visitors' centre for details.

Appendix 9 Continued

Copy of newspaper articles from the Daily Herald which features some of the topics covered during the 2007 year.

Islands 4 July 2007

Stenapa Ranger Carlton van Putten and summer club children at M.C. Schmidt botanical garden.

Stenapa summer club starts off with a bang

ST. EUSTATIUS--St. Eustatius National Park (Stenapa) Summer Club for children started off with a bang on Monday. A total of 34 children, aged 8 to 13, have signed up for the month-long activities, which includes hiking, snorkelling and turtle education.

The objective of the Summer Club is to encourage children to be more active and, at the same time, learn more about some of the fascinating plants, animals and marine life that can be found on their island.

Participation in the club is higher than usual thanks to financial support from John and Danielle Wigington of Veerenergy Resources, who felt the course was a great incentive and agreed to sponsor up to 30 children.

The activities began with a visit to Miriam C. Schmidt Botanical Garden, where the children were given a tour by Ranger Carlton van Putten. They then played a game in which they each were blindfolded and had to identify certain plants or flowers by their smell. These included: white cinnamon, frangipani, Curaçao sage, lemongrass, basil and jasmine.

After the game, the children walked up the Bird Trail leading into the Quill National Park, identifying flora along the way and learning more about the Red Bellied Racer, a snake that lives in the park. To end the morning session, children played a game called "Who Am I?" in which they had to guess which plant or animal they were by asking questions.

Stenapa's Summer Club runs every Monday, Wednesday and Thursday until August 2. The club is coordinated by Stenapa staff and assisted by interns and volunteers. Each child receives a free Stenapa T-shirt and the use of snorkelling equipment. Students can look forward to hikes in the Quill National Park, boat rides to snorkel sites and more information about the life of the sea turtles that live in Statia's waters.

THE DAILY HERALD, Monday, July 9, 2007 Islands 11

Satellite transmission of two turtles terminated

[illegible]

THE DAILY HERALD, Monday, July 23, 2007

[illegible]

Group starts beautification of Statia's Zeelandia Beach

[illegible]

THE DAILY HERALD, Tuesday, August 7, 2007

One of the participants proudly showing her certificate.

Stenapa Summer Club was fun and educational

[illegible]

Appendix 9 Continued

Copy of newspaper articles from the Daily Herald which features some of the topics covered during the 2007 year.

12 September 2007

Islands

Last turtle provided with tracking device

THE DAILY HERALD, Thursday, September 20, 2007

Volunteers clean Zeelandia beach

ST. EUSTATIUS–Some 22 volunteers descended on Zeelandia Beach Saturday, September 15, to participate in the largest and most successful worldwide volunteer movement, the International Coastal Cleanup.

Marine turtle coordinator Arturo Herrera said all volunteers worked vigorously for almost two hours to make the beach a cleaner place.

It was the first time St. Eustatius National Parks (Stenapa) had collaborated with The Ocean Conservancy on this event.

The volunteers collected plastic, cigarette butts, soda cans, fishing lines, plastic bags, paper, wooden pallets, mooring lines and Styrofoam. Over 75 kilos of debris was collected and removed from the beach.

The volunteers included at least three Statia Terminal employees, several St. Eustatius Medical School students, concerned Statia citizens and Stenapa staff and interns.

Herrera said Zeelandia Beach is the primary nesting beach where endangered marine turtles come to nest. Leatherback, Green and Hawksbill turtles have been seen nesting on Zeelandia.

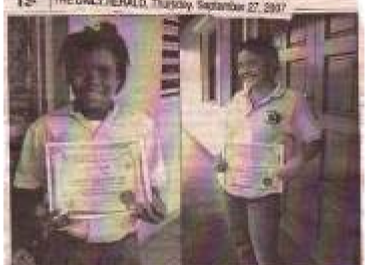
"Since this is the time of the year when hatchlings start to emerge from their nests, it is particularly important that the beach be free of rubbish that can entangle the hatchlings and cause them to perish before reaching the ocean."

The National Parks have been organizing monthly beach cleanups, mostly on Zeelandia, since 2000.

The wider problem of plastic rubbish impacting nature on the island has also been addressed through an eco-bag project. Neighbouring islands are placing taxes on plastic or banning plastic altogether and it is hoped that Statia will soon follow.

Information about future beach cleanups or other upcoming activities of the St. Eustatius Sea Turtle Conservation and Monitoring Programme are available at the National Park visitors centre in Gallows Bay.

THE DAILY HERALD, Thursday, September 27, 2007



Winners of turtle tracking competitions announced

THE DAILY HERALD, Friday, September 21, 2007

Islands

Tagged turtle moving to US Virgin Islands

Appendix 9 Continued

Copy of newspaper articles from the Daily Herald which features some of the topics covered during the 2007 year.

THE DAILY HERALD, Saturday, October 6, 2007

Tracked turtle located off Dominican Republic coast

ST. EUSTATIUS–The continuing chronicles of the plucky green turtle named Track places her off the coast of the Dominican Republic. Previously, Track made a brief stop in the British Virgin Islands.

Satellite tracking proves that after a brief stop at Prickly Pear Island, Track skimmed the northern coast of Puerto Rico. She appears to have stopped off the north-eastern coast of Dominican Republic and is currently moving south down the coast.

Track has covered over 605 kilometres in as little as two weeks, averaging over 43 kilometres per day to reach suitable feeding grounds. Her total distance travelled since obtaining her satellite transmitter on September 2 is 1,135 km.

Track was swimming off Zeelandia Beach on September 17. She was near Zeelandia because this is her nesting area and she nested at least four times this season. This past week, Track's baby hatchlings emerged from Zeelandia from two separate nests, totalling over 130 green hatchlings that safely made it to the ocean.

Marine Turtle Programme coordinator Arturo Herrera has been in contact with Yolanda Leon, a known turtle biologist from the Dominican Republic. Leon has obtained information on the area where Track may potentially be feeding.

The DCNA turtle tracking effort is a collaborative effort between St. Eustatius National Parks (Stenapa) and the Nature Foundation St Maarten. Its objectives are to obtain migration information on hard shell species of sea turtles within the Eastern Caribbean.

Little was known about where turtles that nest in our area go once they leave. This project tracks turtles as they migrate from the nesting beach to their feeding grounds.

Up to date information on Track's whereabouts and data can be found on http://www.seaturtle.org/tracking/?project_id=239, or the Stenapa Website.

Islands 9

Statia turtle migrates to the Dominican Republic

ST. EUSTATIUS–Track, the green turtle fitted with a satellite transmitter on Zeelandia Beach, St. Eustatius, is currently at her foraging grounds near the coastal town of El Macao, Santo Domingo.

According to St. Eustatius National Parks Stenapa, Track is approximately 606 kilometres from her nesting area and has travelled a total of 1,485 kilometres since acquiring her transmitter.

Track has travelled approximately 29 kilometres per day over the 6½ weeks. She travelled 660 kilometres in 10 days to reach her feeding grounds in the Dominican Republic.

Track made a brief stop at Prickly Pear Island in the British Virgin Islands. She then turned her flippers to the northern area of the Dominican Republic coast, progressing Southeast while searching for suitable foraging grounds.

Stenapa contacted Yolanda Leon, a well known turtle biologist in the Dominican Republic, to obtain more on-site information near the town of El Macao. The DCNA turtle tracking effort is a collaborative effort of Stenapa and Nature Foundation St. Maarten to obtain migration information on hard shell (loggerhead, green) species. Both foundations are members of Wider Caribbean Sea Turtle Conservation Network Widecast, which emphasises regional best science practices for marine turtles.

With the help of Leon, another Widecast member, these organisations have received more on-site information on Track.

Appendix 10

Public outreach of a nesting turtle/hatchling release on Zeelandia Beach

Figure 16: Beachgoers observing a hatchling release on 20 June 2007

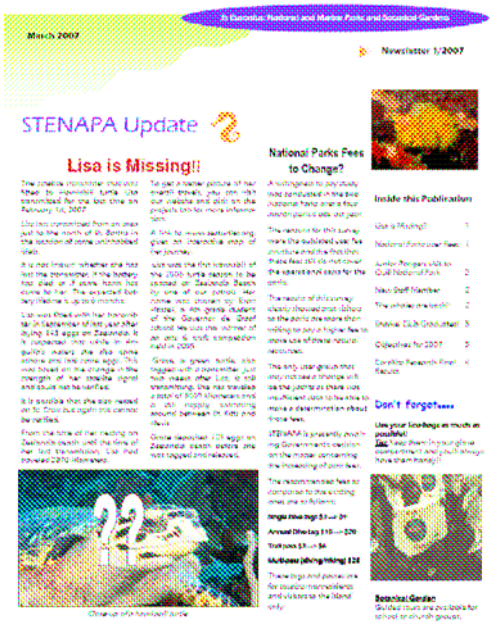
Appendix 10 – Continued

Figure 17: Statia resident and STENAPA intern view nesting leatherback

Figure 18: Yann Arnaud with hatchling

Appendix 11

Copies of 2007 STENAPA Newsletters featuring articles about the Sea Turtle Satellite Tracking Project.



March 2007

Newsletter 1/2007

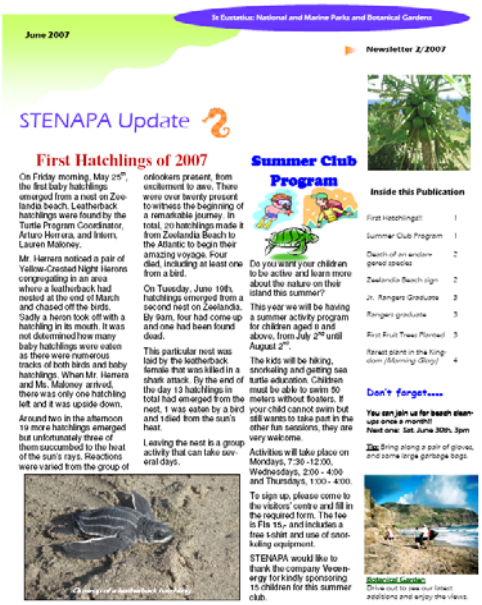
STENAPA Update

Lisa is Missing!!

National Parks Fees to Change?

Inside this Publication

Don't forget....



June 2007

Newsletter 2/2007

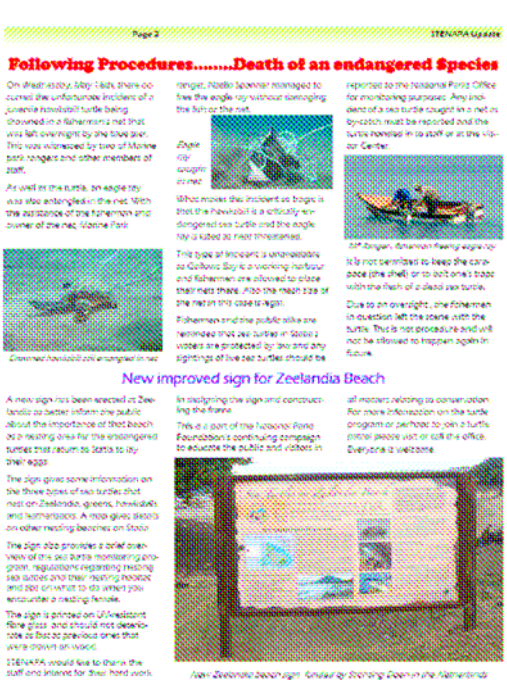
STENAPA Update

First Hatchlings of 2007

Summer Club Program

Inside this Publication

Don't forget....



Page 2

STENAPA Update

Following Procedures.....Death of an endangered Species

New improved sign for Zeelandia Beach

Page 2

STENAPA Update

STENAPA Summer Club 2007 Was Huge Success

Children's Programmes To Start This Month

Appendix 12

Photos of Stranded Turtles and By-Catch Turtles during 2007 Season

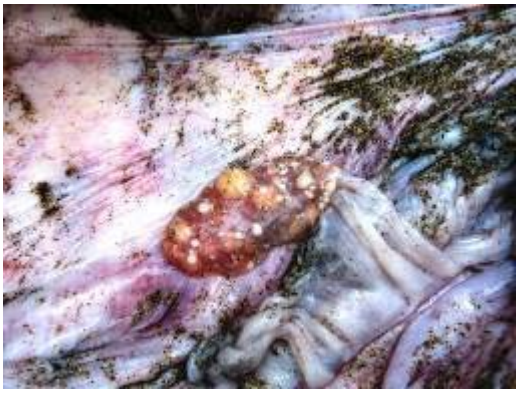


Figure 19: Stranded Leatherback on 29 April 2007

Figure 20: By-catch juvenile hawksbill in 16 May 2007 (photos below)

Figure 21: Juvenile Green Turtle found 9 Nov 2007

Appendix 13

International Coastal Cleanup Day

THE DAILY HERALD, Friday, September 7, 2007

Statia joins international coastal cleanup Saturday

ST. EUSTATIUS–St. Eustatius will be involved with the largest and most successful worldwide volunteer movement, the International Coastal Cleanup, to be held on Saturday, September 15.

This event encourages people to remove rubbish and debris from the world's beaches and waterways, to identify the sources of debris, and to change the behaviour that cause pollution.

St. Eustatius National Parks, Stenapa, has been holding beach cleanups, mostly on Zeelandia, since 2002. These cleanups usually consist of the Marine Park staff, interns and volunteers. Occasionally, local residents or visiting divers or educational groups come to assist in these efforts.

This year is the first time that Stenapa will coordinate the international cleanup on Statia.

Residents of Texas and Oregon conceived the Ocean Conservancy project in 1986. The beach cleanup is unique in the fact that it records all types of trash collected along with the total weight. The numbers of volunteers that participate in the activities are also noted. The data collected have sparked the drawing of a new US bill to track, log, and prevent marine debris.

Over the past 21 years, 6,600,000 volunteers have helped to pick up 116,000,000 pounds of debris over 170,000 miles of beaches and inland waterways. In 2006, a total of 358,617 volunteers pitched in to help clean 34,560 miles of shoreline of some seven million pounds of rubbish. These cleanups occur in over 100 countries.

Stenapa is inviting students, families, social organisations and anyone interested in keeping Statia clean to join in Saturday on Zeelandia Beach from 2:30pm.

Figure 22: Photos of ICC Day

Figure 23: Article on ICC day

Appendix 13

Maps and Photos of DCNA Satellite Tracking Project throughout 2007

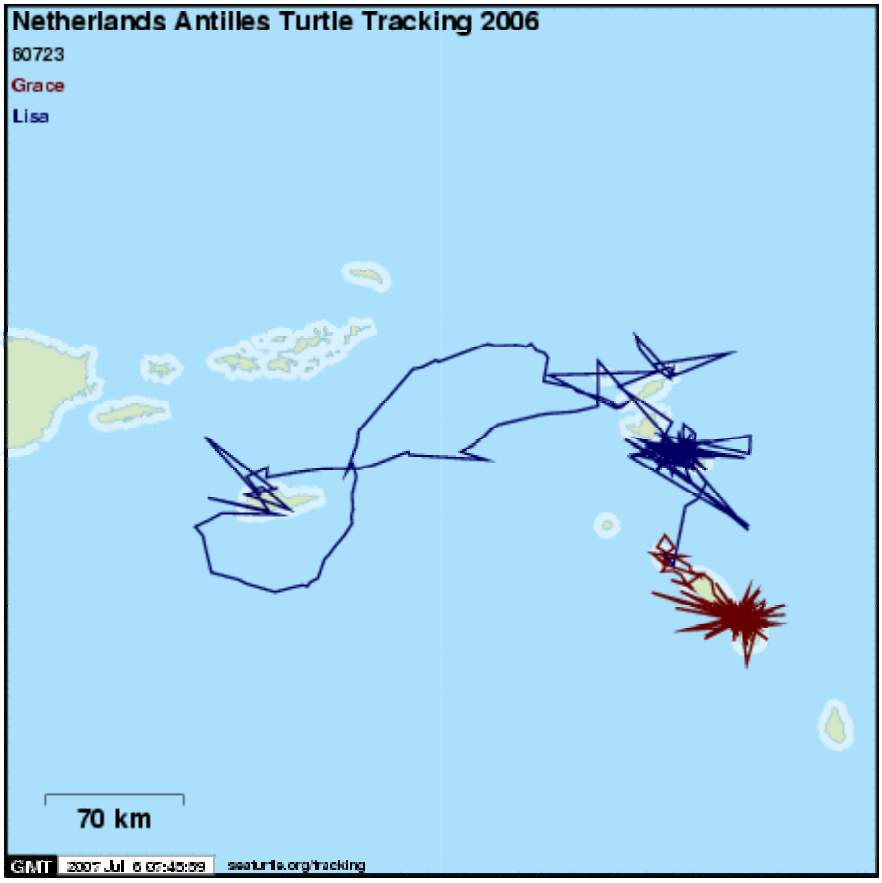


Figure 24: Map of migration routes of Lisa and Grace

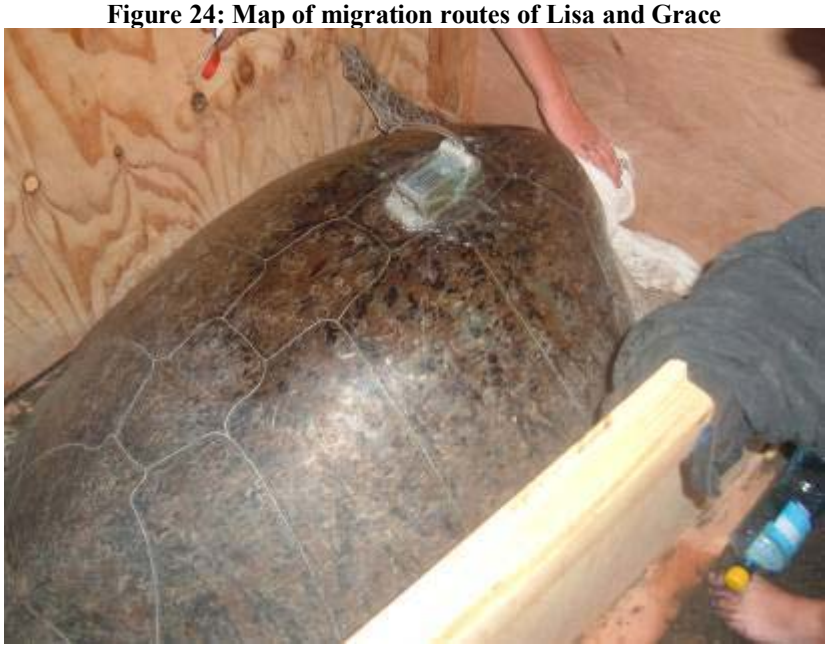


Figure 25: Track receiving her satellite transmitter

Figure 26: Track with transmitter

Figure 27: Competition Winners Faraha Ishamel (left) and Lenaria Brown (right)