

Greetings fellow turtlers!

I hope this finds you all well, and fondly remembering your time with the leatherbacks in St. Croix. During the 2006 season our project was assisted by 40 outstanding Earthwatch volunteers. Together, you helped us attain our research goals while aiding the conservation of a 125+ million year old species, and building great friendships as you went along. You all worked very hard, spending over 2,700 hours on the beach and collectively walking over 1,000 miles for a very worthy cause. You were able to collect data on 522 turtle activities of 92 leatherback turtles and 11,428 hatchlings!

Without your help we would not have been able to cover the beach, tag all the turtles, collect necessary data and samples, and relocate eggs - all at the same time! Your assistance was priceless. I hope that you enjoyed your experience as much as we enjoyed sharing it with you, and we expect to see you all on the project again in the very near future!

For the two or three teams that fielded while I was stricken with bronchitis and an upper respiratory infection, I appreciate your concern and understanding. I did make a full recovery after intense antibiotics and a few nights of rest. Steve and I are currently well and expecting a hatchling of our very own on May 2<sup>nd</sup>. Morgan Elizabeth Garner will be joining the turtling world in the height of leatherback season. Although my digging and midwifery skills have been honed over seven seasons with the turtles, we don't plan on giving birth at Sandy Point! We'll leave that to the leatherbacks! The rest of the team is also well and busy gearing up for another year of tagging, research, and new experiences with a new crop of volunteers. Please visit our website at [www.wimarc.org](http://www.wimarc.org) to get a status of the turtle population and our research activities.

From the turtle gang (Jeanne, Steve, Jeremy, Tiffany, Kendra, Mandy, Emily, and all the dogs), we wish you the best in the future, until we meet again!

Take care,

Jeanne A. Garner  
Principal Investigator  
Saving the Leatherback Turtle

## EARTHWATCH INSTITUTE FIELD REPORT

**Project Title:** Saving the Leatherback Turtle

**Principal Investigators:**

Jeanne A. Garner<sup>1, 2,</sup>

Steven A. Garner<sup>1,</sup>

Peter Dutton<sup>3</sup>

**Position/Affiliations:**

<sup>1</sup>WIMARCS (West Indies Marine Animal Research and Conservation Service)

<sup>2</sup>Texas A&M University

<sup>3</sup>NMFS – Southwest Fisheries Science Center

**Research Site:**

Sandy Point National Wildlife Refuge, Frederiksted, St. Croix, U.S. Virgin Islands

(17.67N, 64.9W)

**Local Management Status of the Research Site:**

The research site is located on the Sandy Point National Wildlife Refuge and is managed by the U.S. Fish and Wildlife Service.

**Scientific names of primary species being studied:**

*Dermochelys coriacea* (leatherback turtle)

*Eretmochelys imbricata* (hawksbill turtle)

*Chelonia mydas* (green turtle)

**Key Research Objectives:**

- Tag each nesting female
- Document each turtle activity
- Relocate nests that are in danger of erosion or inundation
- Conduct research on the ecology and biology of the nesting females (feeding behavior, endocrinology, nutritional status) and emerging hatchlings (investigate mortality, sex ratios)

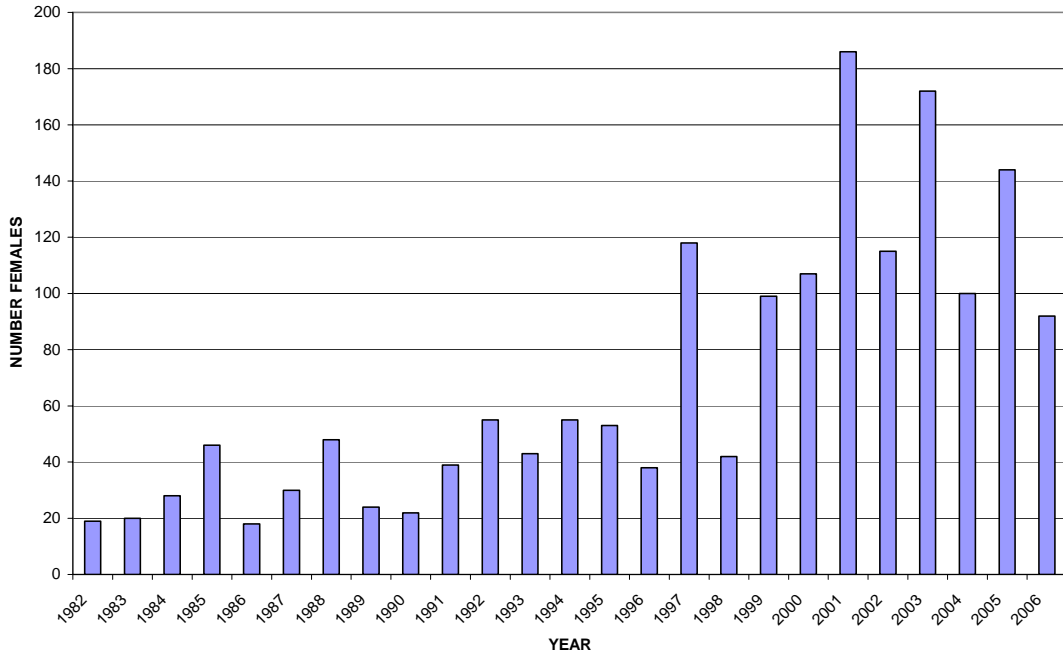
- Continue tag retention studies of flipper tags and magnetically coded internal tags (pit tags)
- Use genetic studies to examine regional population structure
- Utilize blood samples to investigate hormonal and nutritional chemistry of leatherbacks, as it relates to nesting physiology
- Study the geographical movement of the nesting female leatherback during the “internesting period”. Additional data will be collected on the beach as well as attaching satellite telemetry transmitters to the turtle
- Study the dive behavior of the nesting female leatherback based on her expended energy and activity while on the beach
- Increase hatch success by moving relocated nests to a more ideal beach area while maintaining natural sex ratios. More ideal relocation areas are erosion free, moisture balanced, and free of roots and vegetation

### **Data Collection and Results**

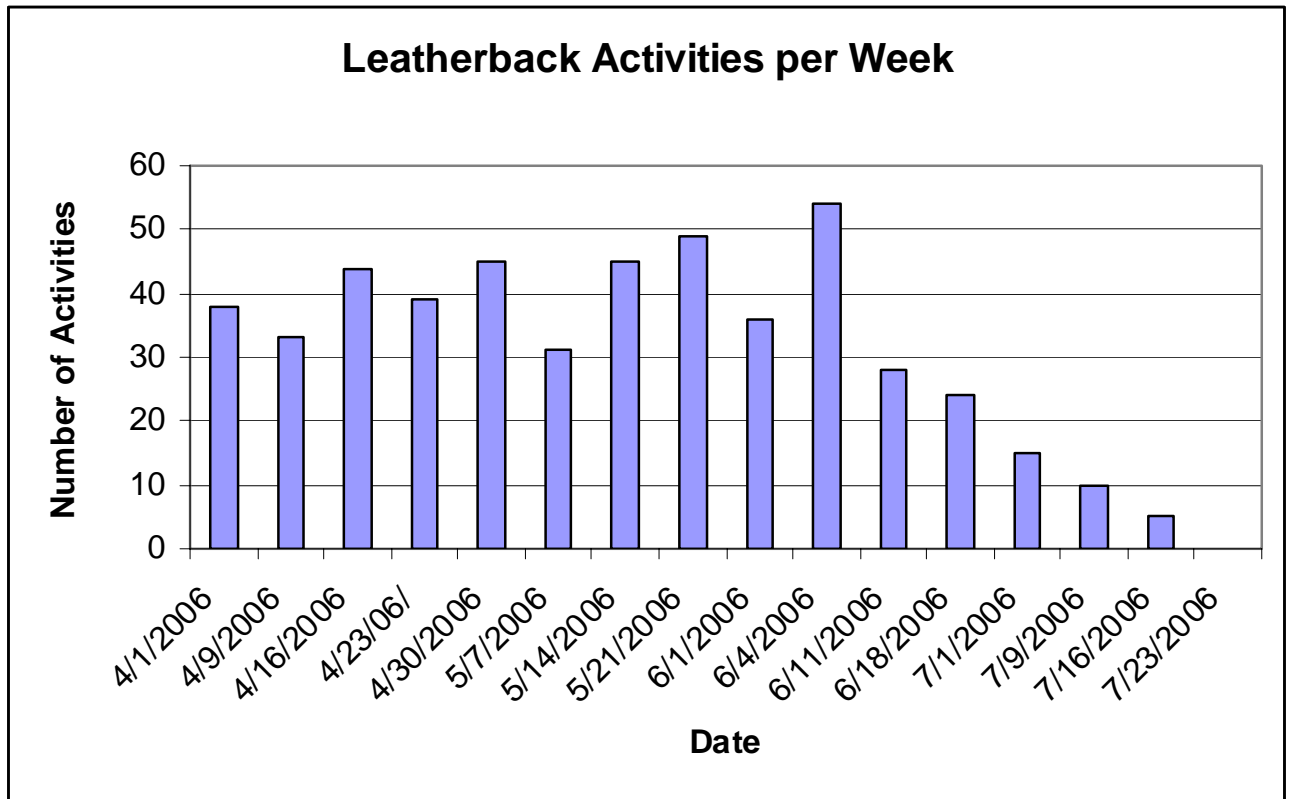
This project is run by the West Indies Marine Animal Research and Conservation Service (WIMARCS) with support from the Earthwatch Institute, the Virgin Islands Department of Planning and Natural Resources - Division of Fish, Southwest Fisheries Science Center, and Wildlife and the U.S. Fish and Wildlife Service. The Sandy Point National Wildlife Refuge in St. Croix, U.S. Virgin Islands supports the largest continuously studied population of nesting leatherback sea turtles in the world (Figure 1).

Flipper tagging began in 1977, and since 1981 saturation tagging and consistent night patrols during the nesting season have yielded a comprehensive database of information on each female nesting at Sandy Point. The 2006 nesting season began with a nest discovered during U.S. Fish and Wildlife surveys on February 22<sup>nd</sup>, and ended with a final activity on July 23<sup>rd</sup>. Activity was highest during the weeks of May 21<sup>st</sup> and June 4<sup>th</sup>. (Figure 2).

**ANNUAL NUMBER OF FEMALES ENCOUNTERED 1982-2006**



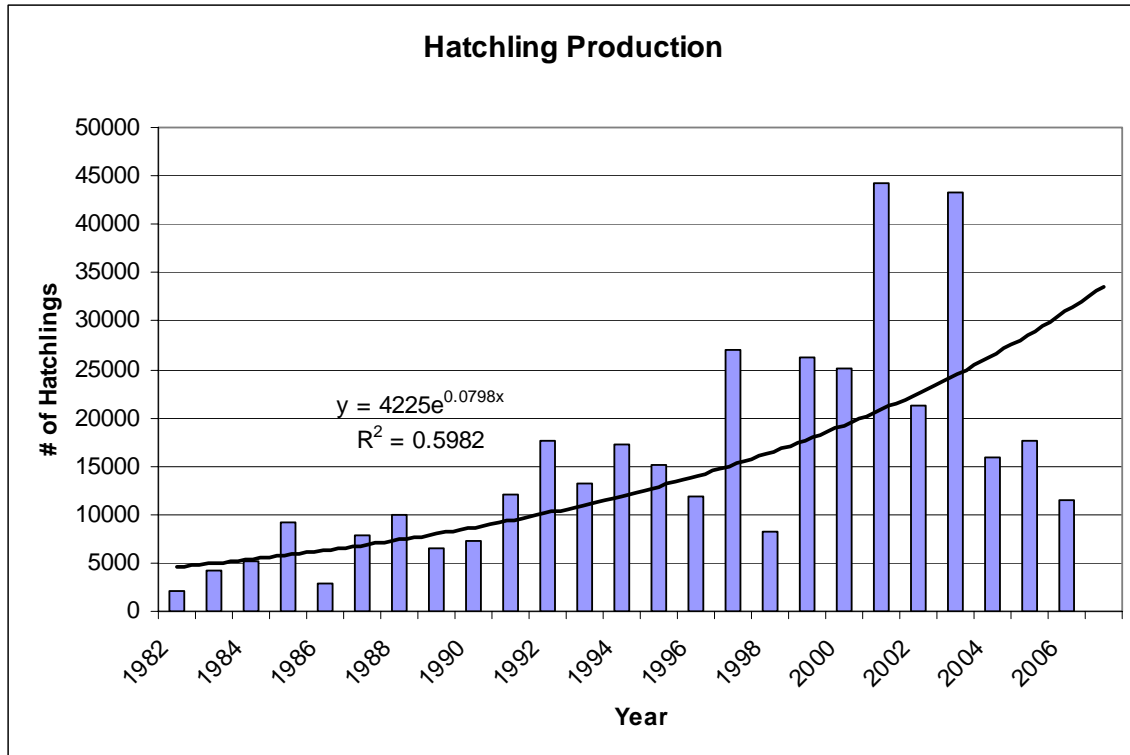
**Figure 1.** Annual number of nesting turtles encountered from 1982 to 2006



**Figure 2.** Overall number of activities of leatherbacks on the beach by week

Ninety-two turtles laid a total of 373 nests with an average of  $75.74 \pm 18.93$  yolked eggs per clutch. Of nests laid in 2006, 180 (48.3%) were relocated to protect them from inundation or erosion. The number of documented nests per female ranged from 0 to 9 with an average of  $3.70 \pm 2.08$  for those turtles that laid. Sixty-one of the turtles were remigrants, with remigration intervals of 2 - 6 years. Of the 222 nests analyzed, mean overall hatch success was  $46.83 \pm 24.57\%$ . Like most previous years, emergence success of *in situ* nests was significantly higher than that of relocated nests ( $p < 0.01$ ). We estimate that approximately 3.5% of the nests were lost to erosion and 14.75% experienced some form of predation. With the addition of 31 untagged turtles in 2006, a total of 906 leatherbacks have been tagged since 1979. Nightly patrols and a concerted relocation effort have reduced the major historical threats of poaching and erosion, although historically there is still poaching of both eggs and adults of green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) turtles after nightly patrols cease. Nightly patrols and the relocation effort have allowed for the safe nesting of adult females and an increased production of hatchlings annually as shown in Figure 3.

Blood and skin samples were collected for genetic and biochemical analysis. Red blood samples were processed from 75 turtles (including 26 neophytes), while 74 skin samples were processed (including samples from 25 neophytes). Plasma samples were processed from 84 turtles (including 28 neophytes) and serum samples were processed from 85 turtles (including 28 neophytes). Plasma and Serum samples were collected for further analysis of physiological parameters. These parameters include: parathyroid hormone, vitamin D (1,25 dihydroxycholecalciferol), testosterone, vitellogenin, and circulating calcium levels. Plasma and serum will be analyzed by Jeanne Garner and faculty at Texas A&M University, College Station, Texas, as part of the Wildlife and Fisheries Science, PhD program (Garner, 2006). Genetic analysis is currently being conducted by Dr. Peter Dutton at the NOAA-NMFS Southwest Science Center's, La Jolla, California, Laboratory.



**Figure 3.** Graph of the number of hatchlings produced by year from 1982 to 2006

### Significance/Benefits of Research

This long term study provides information which helps identify population fluctuations, trends, and changes in productivity, in addition to conducting novel research.

The increased number in adults seen recently may likely be a result of the nest relocation program. This may be confirmed in the future by DNA data and continued research. These increased numbers are extremely encouraging for the future outlook of the population and the success of the project, as well as the success of the species. The steadily increasing and consistent numbers evidenced since 1991 suggest that a long-term commitment of 10 or more years is needed before the effects of recovery can be measured. While there are similar increases in other leatherback populations throughout the Caribbean (such as in Puerto Rico), leatherback populations in other parts of the world (such as the Pacific) continue to decline at an alarming rate. This is one of the longest running projects of its kind in the world, and yields some of the only long-term data available on individual leatherback turtles. State and federal agencies continue to use information from the project to form conservation and management policies for sea turtles.

### Dissemination of Results

Local residents, mainly children, are allowed supervised access to the refuge during leatherback nesting season. This access teaches the importance of our sea turtles as well as a new understanding of this magnificent reptile. Hundreds of visitors per season, combined with programs in local schools, have resulted in a massive increase in public

awareness of this program and the plight of the leatherback turtle. Project staff also conduct local community presentations, as well as an annual presentation at Earth Day.

In addition to these presentations and programs, the following documents are a few of the many documents produced from the research and conservation efforts of this project.

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### **Volunteer Tasks and Accomplishments**

- a) How did the volunteers contribute ideas, skills, expertise and motivations beyond that which you anticipated?

One of the most valuable and productive aspects of the volunteer program is the interaction with vastly different volunteer personalities and experiences. The various curiosities and knowledge base of the volunteers keep the project staff always thinking. This environment along with various volunteer skill sets has given the staff many ideas about current and future experiments.

Perhaps the most valuable aspect of the project is the incredible feeling that the staff gets when a volunteer has the experience of a lifetime. Volunteers are forever changed when helping to save this truly remarkable and charismatic species. From protecting the vulnerable adult nesting leatherback to rescuing a 50g hatchling from a nest, we have the privilege of seeing a difference made right before our eyes. Not only has each volunteer been dramatically affected, they in turn carry our protection and conservation message throughout the world.

- b) How have volunteers helped you to achieve your research or educational objectives? Please give specific and quantitative measures of the volunteers' contribution to your data collection.

Earthwatch volunteers are an integral part of the leatherback project. The intensive research and conservation effort provided by this project would not have been possible without the assistance of 1,401 Earthwatch volunteers who over the past 26 years have contributed over 111,640 hours patrolling over 92,602 miles of beach.

Volunteers are responsible for patrolling a 3km beach hourly while collecting data on each nesting leatherback turtle. Volunteers collect, on average, 65% of all data collected on the female leatherback during nesting.

### **Project Development**

- a) What logistical or scientific challenges have you encountered in the past season and how will you address them during the next field season?

We had large groups of teenagers this year. One of the issues that we have struggled with in the last couple of years is the lack of interest of most of the teens. They enjoy being in St. Croix, but it can be difficult holding their attention at dinner if the conversation involves turtles or biology research. These groups seem to be somewhat uninterested in the sea turtle work and more interested in socializing. In 2006, a "facilitator" was provided by Earthwatch to manage the teens; although this helped tremendously with the social (i.e. non-project activities), it still didn't help with the general lack of interest. In 2007, we will continue to modify and enhance our presentation to increase the interest level of the teen groups in order to ensure higher quality participation by younger groups.

In 2006, a larger staff and additional funding allowed us to increase our research activities above the normal scope of work. Even though valuable data was collected and analyzed, more questions were raised and our decrease in nest hatch success has yet to be answered. Our research efforts to address this hatch success are crucial to recover the leatherback turtle in the Atlantic and possibly the Pacific. Effective research efforts must continue to address this disturbing decline. Staffing and funding efforts are underway to accomplish this in 2006.

- b) Have you used any additional methods/strategies to meet your research objectives? If so, please describe them.

We have continued to create and expand our “partnerships” with organizations like NOAA (NMFS), U.S. Fish and Wildlife Service (USFWS), and other researchers to meet our research objectives. This will allow the project to meet its additional research objectives while working with a small budget.

- c) How will you develop your research in the coming field season?

WIMARCS along with its partners are continuing to hone and expand our comprehensive research plan for 2007. This plan along with WIMARCS staff will ensure a more organized and focused research program.

### **Educational Opportunities**

- a) Does your project directly or indirectly involve the following groups in your research topic?

- Local communities
- Students
- Early career scientists
- Other groups

The Leatherback Turtle program is directly involved with students, early career scientists, and government agencies while being indirectly involved with the local community.

- b) Please tell us the ways your research helps these groups better understand the conservation of a sustainable environment (see the UNESCO definition above).

Since 1996 the community education program has focused on educating school and youth groups about the plight of the leatherback sea turtle. The education program encourages local members of the community to observe nesting leatherbacks and learn about the importance of conservation practices. This program is vital to the survival of St. Croix leatherbacks and their habitat since it teaches locals, and especially local children, about the importance of conserving natural resources. Although priority is given to children, the education coordinator ensures that as many local residents as possible have the opportunity to learn about the project first-hand. Before observing the turtles all visitors receive an orientation lecture which familiarizes them with turtle behavior and beach etiquette. In many cases the children get an opportunity to assist with data collection (e.g. holding a tape

measure, reading a stake number, or pointing out diagnostic markings). This greatly increases their interest in the turtles and the project, as well as their understanding of how to collect and use scientific data. The education program has been extremely successful in garnering the interest and support of the local community and increasing their involvement in sea turtle protection and conservation.

This project has also been instrumental in launching the Local Community Conservation Program (LCCP) that solicits, trains, and educates local community groups to better understand and monitor turtles and their respective nesting beaches throughout the USVI.

This project has always encouraged and sought early career scientists to work on the project and gain experience. 2006 was no exception as we had two different collegiate students work with us throughout the year. This gave the students an invaluable experience while motivating them to pursue their studies and careers in marine biology.

Through our conservation and education efforts, the St. Croix community has taken pride in "their" leatherbacks. Slowly, but steadily, we have shown the community the value of the sea turtle while assisting them to safely and productively save the leatherback sea turtle. Our goal is to assist the local community to provide a sustainable environment for both humans and sea turtles.

- c) Has your project helped lead to the completion of Masters' theses, or other educational research findings?

This project currently supports Emily Weston (a former Earthwatch volunteer) in her pursuit of a Bachelor of Science in Marine Biology. We also have a PhD candidate (Jeanne Garner) as well as two field leaders (Jeremy Conrad, Kendra Garrett) pursuing their Masters Degree.

## **Partnerships**

- a) List partnerships or collaborations with other organizations that you have developed or maintained in the past season.

WIMARCS and the leatherback project have partnered and collaborated with the Earthwatch Institute, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Virgin Islands Department of Planning and Natural Resources to staff, operate, and manage the research, conservation, and education objectives of the project, as well as other sea turtle programs in the USVI.

- b) How have these organizations contributed to your project objectives?

Earthwatch Institute provides volunteers along with additional monies to pay for accommodations, food, transportation, office supplies, and equipment repair.

U.S. Fish and Wildlife allow us access to the refuge, beach security, and provide safety lectures along with the sea turtle youth education program.

The National Marine Fisheries Service provides research advice, equipment, supplies, and blood analysis.

The Virgin Islands Department of Planning and Natural Resources provides financial assistance for the project staff, volunteer transportation to the field, equipment, and assistance with volunteer "free time" entertainment.

- c) How do you anticipate these organizations will use the results generated by the project, and in what timeframes?

Earthwatch will continue to use the results annually to obtain donations and recruit future volunteers. The government agencies will continue to utilize the results from this project to maintain and update effective sea turtle and beach management plans.

### **Acknowledgements**

The Leatherback Turtle Research and Conservation Project is run by WIMARCS with support from many government and non-government agencies. Funding is provided by the United States Fish and Wildlife Service Section 6 appropriations (through VI DPNR), United States Fish and Wildlife Service Coastal Program, the Southwest Fisheries Science Center, and by Earthwatch Institute in Maynard, MA. Staff for 2006 included Jeanne Garner, Steve Garner, Jeremy Conrad, Tiffany Cummins, Kendra Garrett, Mandy Karch, and Emily Weston with support from William Coles and Peter Dutton.

We would like to express our deep appreciation and respect to the 1,401 Earthwatch volunteers who have provided this project with continuous quality field assistance since 1982, and without whom this level of research would not be possible. The assistance that Anne Ogilvie and Alison Whelan provided was absolutely invaluable. Their patience and handling of difficult situations made the project run smoothly.

WIMARCS owes a great amount of gratitude to William Coles, USVI Endangered Species Coordinator. William was eager to educate and entertain the Earthwatch volunteers and was eager to streamline the permitting process. He consistently supports our research activities.

Much respect and appreciation also go to Mike Evans, USFWS Refuge Manager, who not only put in long hours and often assumed personal risk to maintain order at the refuge and ensure that regulations were being followed, but also volunteered to help out with visitors. Claudia Lombard and Amy Mackay, USFWS, recorded early-season nesting activities prior to March 1, in addition to assisting with patrols. Amy Mackay also served as Education Coordinator for the Sea Turtle Education Program. We cannot express how invaluable the help was that was provided by USFWS personnel.

We would also like to thank the Benedict family, proprietors of Cottages-By-The-Sea, for their support and for providing a friendly and comfortable base of operations for this project.