Hawksbill Turtles of Barbados

EXPEDITION BRIEFING
Dear Earthwatch volunteer,

I would like to take this opportunity to thank you for your interest in participating with the Barbados Sea Turtle Project in 2004. Hawksbills have long been harvested for their shell, meat and eggs resulting in populations that are severely depleted globally. Barbados has one of the largest hawksbill nesting populations in the insular Caribbean. Shy and secretive, hawksbills emerge under the cover of darkness to make their nests, preferring the narrow, relatively steeply sloping coral sand beaches that typify the leeward coasts of tropical islands like Barbados. Sea turtles are amongst the most fascinating of species. Marine, but dependent on the land to reproduce; they may spend decades migrating over vast areas of ocean, before homing back to the beach they were born on to lay their own eggs. Witnessing the emergence from the sea of one of these mysterious creatures or watching hatchlings disappearing into the waves are unforgettable experiences, experiences that continue to thrill and amaze even after years of working with them.

Largely due to the efforts of the Barbados Sea Turtle Project, the hawksbill is now protected from harvest in Barbados. However, much remains to be done to ensure their recovery. You will participate in our on-going monitoring activities collecting information on this poorly understood species. Most of the monitoring will take place on the beaches during nightly patrols, although there will likely be at least one opportunity during your stay to assist with our monitoring programme for hawksbill turtles that forage on our reefs. On the beach, we will watch nesting turtles from a distance until they have finished digging the nest chamber. You will then assist in measuring and tagging the animals immediately after they drop their eggs. By confining our data collection activities to this time we minimise the possibility of disturbing them. After the data are collected, the female is left alone to cover her eggs, disguise the nest and make her slow and steady way back to the sea. Identification of females allows us to gather information on how faithful females are to particular beaches, how many nests they lay in a season and how often they return to Barbados to breed. Barbados is one of very few locations in the Caribbean to collect these types of data on hawksbill turtles. Your work on the beaches will produce status information on hawksbills that will be used in decision-making at the international level to determine whether trade in tortoiseshell should be resumed.

As the season progresses, hatching will begin and previously marked nests will be excavated and examined to ascertain hatching success. Given the long breeding season of the hawksbill turtle, we anticipate that even the earliest Team will have the opportunity to see both adult turtles and hatchlings. At hatching events, volunteers will be exposed to another significant constraint to sea turtle recovery in Barbados, namely disorientation of hatchlings from beachfront lighting. In the past, disorientated hatchlings have been collected from swimming pools, bars, restaurants, drainage ditches, and roads. Our efforts to rescue disorientated hatchlings and to reduce the levels of beachfront lighting have contributed greatly to increasing the numbers of hatchlings that successfully reach the sea annually.

Barbados is a small, densely-populated developing country, heavily dependent on tourism for its economic well-being. The beautiful beaches for which Barbados is famous are important recreational areas for Barbadians and tourists alike. There are no protected turtle nesting beaches in Barbados. Therefore, during all of our activities, we will be interacting with other beach-users.
These will include local people such as fisher folk and hotel staff, as well as tourists. Many people encountered will never have seen a living sea turtle. Witnessing a sea turtle nesting or hatching and learning about the animal actually in front of them on the beach is a learning experience more meaningful than any gained through the classroom or media. We believe strongly that the successful recovery of sea turtles in Barbados ultimately depends on Barbadians valuing them over and above the more traditionally understood consumptive value!

Consequently, we try to use interactions on the beach as opportunities to pass on information about sea turtle biology and their role in the healthy functioning of nearshore ecosystems, as well as their potential value as eco-tourism attractions. You can be assured that work on the beach will sometimes be tiring, but it will offer a variety of rewarding experiences.

On behalf of Barry Krueger, Jen Beggs and our other staff, I look forward to welcoming you as participants in the Barbados Sea Turtle Project in 2004.

Sincerely,

Julia Horrocks, Ph.D.
Director, Barbados Sea Turtle Project
Hawksbill Turtles of Barbados

Table of Contents

1. The Project ........................................................................................................................................6
2. Research Objectives ........................................................................................................................8
3. Methods.......................................................................................................................................9
4. Application of Results ..................................................................................................................10
5. Field Training...............................................................................................................................12
6. Volunteer Assignments ...............................................................................................................13
7. Project Staff ..................................................................................................................................13
8. Research Area ...............................................................................................................................15
9. Travel Planning .............................................................................................................................16
10. Itinerary .........................................................................................................................................19
11. Daily Schedule ............................................................................................................................20
12. Team Development .....................................................................................................................20
13. Accommodations ..........................................................................................................................20
14. Food........................................................................................................................................21
15. Physical Conditioning ..................................................................................................................22
16. Medical Advice ............................................................................................................................24
17. Emergencies in the Field ............................................................................................................25
18. What To Bring ...............................................................................................................................27
19. Helpful Resources .......................................................................................................................29
20. The Reading List ..........................................................................................................................30

Literature Cited ...................................................................................................................................30
Abstract of Proposal

Hawksbill sea turtle (*Eretmochelys imbricata*) population declines in Barbados were caused largely by illegal harvest of nesting females, and also by large legal harvests in countries in which Barbados’ turtles spend either their developmental years or the years between nesting seasons. A second major factor affecting hawksbills in Barbados is the deterioration of nesting beaches. This deterioration has led to a reduction in the availability of dry sand above the high water mark for nesting and increasing disorientation by artificial lights amongst adult females and hatchlings. The primary objective of the Barbados Sea Turtle Project is to recover Critically Endangered (cf. IUCN, 2000) hawksbill sea turtles and their nesting habitats around Barbados. This recovery process involves: (1) the application of scientifically sound conservation measures in the field, supplemented by public education programmes; (2) the establishment of monitoring programmes to continually assess the status of the stocks and the effectiveness of the conservation measures implemented, and (3) research to improve the quality of the conservation measures implemented. Monitoring programmes (nesting beach and in-water) assess the impacts of conservation activities on hawksbill population recovery.
Earthwatch volunteers are tasked with monitoring the index nesting beach (a beach that has been monitored every night each year between June and September since 1997) and other high-density nesting beaches. Data taken on tagged nesting females permit investigations into inter-nesting and remigration intervals, nest site fidelity, and the recruitment of newly matured females to the nesting population, to be undertaken. Data are also collected on nesting behaviour, hatching success, and hatching vigor in order to assess the impacts of coastal development on nesting success and early survival rates of hatchlings as they leave the beach. Nightly presence on the nesting beaches also enhances the survival of nesting females through a reduction in the incidence of poaching, and rescue of disoriented and injured adult females, and reduces mortality of emerging hatchlings caused by erosion and beachfront lighting. Conservation and monitoring are facilitated through (1) a 24-hour response to public “hotline” reports of nesting and hatching events of hawksbill turtles, (2) all-night patrols of an index beach and (3) nightly patrols of high density nesting beaches. Monitoring therefore requires four teams of personnel, one stationed on the index beach all night, two mobile teams responding to hotline calls during the night, and one team responding during the day. Being one of only a few countries in the Wider Caribbean that is monitoring trends in population abundance of hawksbills and collecting data on population parameters that can allow interpretation of trend data, information collected is being used internationally to inform the CITES (Convention on International Trade in Endangered Species of Fauna and Flora) Hawksbill Range States Dialogue meetings, as well as to guide national policies and conservation strategies.
RESEARCH PLAN

1. THE PROJECT

The Barbados Sea Turtle Project (BSTP) is an activity of the University of the West Indies (UWI), Cave Hill Campus, working in close collaboration with the Fisheries Division, Government of Barbados, Ministry of Agriculture and Rural Development. The project is headed by Dr. Julia Horrocks and staffed by UWI graduate students and volunteers. Field activities are coordinated by M.Phil. graduate student, Barry Krueger, with the assistance of other graduate students and interns. The primary objective of the activities of the Barbados Sea Turtle Project is to recover Critically Endangered (cf. IUCN, 2000) hawksbill sea turtles (*Eretmochelys imbricata*) and their nesting habitats. This recovery process involves: (1) the application of scientifically-sound conservation measures in the field, supplemented by public education programmes; (2) the establishment of monitoring programmes to continually assess the status of the stocks and the effectiveness of the conservation measures implemented, and (3) research to improve the quality of the conservation measures implemented.

Hawksbill sea turtles of all size classes can be found foraging on the coral reefs around the island, but adult females are typically only found in Barbadian waters during the breeding season, which peaks between May and October. At this time, adult females arrive to nest on the island’s beaches, particularly on the more sheltered west and south coasts. Until the recent ban on sea turtle capture in July 1998, all species of sea turtles could be captured in Barbadian waters, except those within 100 yards of shore and those below 30 lbs in weight. Capture on the beach has been illegal since 1904, but was poorly enforced. The ban on harvest was legislated based on information provided by the Barbados Sea Turtle Project (then based at Bellairs Research Institute) on the precarious population status of hawksbills through the late 1980s and 1990s. Hawksbill population declines were caused largely by illegal harvest of adult females on Barbados’ beaches, and probably by large legal harvests in countries in which Barbados’ turtles spent their developmental years.

The nesting beaches on the west and south coasts are heavily impacted by tourism. Like sea turtles, tourists also like the calm near shore waters characteristic of these coasts and hotels tend to be concentrated here. For this reason, a second major factor adversely affecting sea turtles is the deterioration of nesting beaches leading to a reduction in the availability of dry sand above the high water mark and increasing disorientation by lights amongst adult females and hatchlings (Horrocks & Scott 1991). With increased knowledge of the status and distribution of nesting hawksbills, a Sea Turtle Recovery Plan for Barbados was written (Horrocks 1992), and the BSTP has been implementing the specific recommended actions of this Plan since. During the early years, the BSTP efforts were firmly focused on conservation activities. These included activities that directly mitigated against negative impacts on the turtles themselves, e.g. protection of adult females from poachers and recovery of hatchlings disoriented by lights, and those designed to increase awareness amongst fishermen, school children and other segments of society about the hawksbill’s status. A 24-hr “hotline” (a well-publicized, public accessible cell phone help-line for turtle-related events) was established. This hotline is an ongoing and essential component of our programme today. It is operated by BSTP personnel, who respond to all calls reporting nesting, hatching, injuries to sea turtles at sea or on the beach, and live/dead strandings, all year round. With the cooperation of the general public who live and/or work on
the coast, as well as visitors to the island, incidents of nesting and hatching are called in to the hotline. BSTP personnel then travel to the beach to tag and measure the turtle, mark the nest location, relocate the nest if necessary, and ensure that the turtle re-enters the sea safely. Subsequently, hatching events are also attended by BSTP personnel, to quantify nest fate (including hatching success) and to ensure that hatchlings are not disoriented by coastal lighting in their migration from the nest to the sea.

The BSTP explicitly seeks the involvement of the national regulatory agencies and coastal zone authorities in the execution of its conservation activities. Guidelines for coastal building applications, and coastal armouring and stabilization projects have been developed, and the BSTP is frequently requested to review applications for coastal construction adjacent to nesting beaches. In addition, the BSTP has developed a broad environmental education programme that includes a slide show for secondary schools, colouring books and games for primary schools, presentations to hotels and community groups, staged hatching releases from the small number of nests that are artificially incubated annually, and most recently an informative website (http://www.barbadosseaturtles.org).

In order to continuously improve the mitigation techniques used and to better inform policy regarding sea turtle management at the national and regional level, research relevant to sea turtle conservation is ongoing. Research areas include investigations into the recruitment rate of newly matured females to the nesting population, investigations into the microbial environment of sea turtle nests and the function of mucous secreted by the female in controlling egg infection, investigations into the impacts of coastal development on nesting behaviour (including nest site fidelity), hatching success, hatching vigour and early survival rates upon leaving the beach, the use of predicted sea level rise scenarios to assess future nesting beach availability for hawksbills, the use of sonic/radio tracking to determine home range size, residency and growth rates of juvenile hawksbill turtles on foraging grounds around the island, the use of satellite telemetry to track migration routes and destinations of adult female and male hawksbills, and genetic studies to identify the stock structure of both nesting and foraging populations.

In order to assess whether conservation efforts are having an impact on hawksbill populations, it is necessary to monitor changes in relative abundance from year to year. Barbados is the only country in the Caribbean to monitor hawksbill nesting activity island-wide and throughout the year. All-night monitoring of an index beach on the south coast of the island and nightly monitoring of high density west coast nesting beaches is undertaken for four consecutive months (June-September) at the height of the breeding season. The hawksbill index beach monitoring programme in Barbados is one of only three such monitoring programmes in the insular Caribbean. Data gathered on this index beach will be used by the Government of Barbados to make an informed decision on when, or indeed whether, it is appropriate to re-open the sea turtle fishery. A sea turtle nesting beach monitoring programme requires a considerable and reliable commitment of financial resources over a period of years. This requirement is because an increase in numbers of nests or females in any single year does not necessarily indicate that there is a real sustained population increase. Since hawksbills nest at 2-5 year intervals, there may be some years where many females coincide in nesting and some years when few do. An average inter-nesting interval is 2.5 years. Therefore in order to obtain three data points i.e. the minimum number to detect a trend, monitoring of nesting beaches should continue for at least 8 years.

Being one of only a few countries in the Wider Caribbean that monitors trends in population abundance of hawksbills and collects data on population parameters that can allow interpretation of trend data, information collected is being used internationally to inform the CITES (Convention on International Trade in Endangered Species of Fauna and Flora) Hawksbill Range States Dialogue meetings. The objectives of these meetings are to determine the population
status of hawksbills in the region, the threats to population recovery and to propose management strategies that will ensure the sustainable use of the sea turtle resource in the future. In short, the nesting beach monitoring programme is collecting information that has tremendous value for national and international efforts to conserve hawksbill turtles. Without the continued support of Earthwatch and its volunteers, it is likely that the hawksbill beach monitoring programme in Barbados would be under threat.

2. **RESEARCH OBJECTIVES**

A brief description of the BSTP research activities already underway or proposed for the coming season is provided in Section 1. Much of the data to address research objectives have been collected on nesting beaches over the last three years by patrols composed largely of Earthwatch volunteers. These include data collected on numbers of nesting females, on clutch frequency and re-migration (inter-seasonal) intervals of tagged females, and the recruitment of newly matured females onto nesting beaches (Krueger et al. 2002). Average clutch size per season is an important parameter to estimate correctly, because it will be used with increasing frequency as the additional Nesting Beach Monitoring projects in various countries in the region, identified during the Second Hawksbill Dialogue, are implemented. These programmes are daytime monitoring programmes that estimate relative abundance of nesting females from nest counts. Underestimation of average clutch frequency leads to over-estimation of population size and vice versa.

It has been hypothesised that newly recruiting females may lay fewer clutches per season than older females. It is therefore important to assess whether newly recruited animals do have a different average clutch size than older remigrant females when estimating abundance from nests made by a recovering population. Data collected on nest site fidelity will assist in estimating average clutch sizes more accurately. It has been assumed that female fidelity to a nesting beach is such that nightly monitoring of a given beach will result in the monitoring of all nests made by a female in a given season. However, fidelity may be affected by coastal development, resulting in females having to spread nests out further due to lack of beach space for nesting.

Research into the impacts of coastal development on nesting behaviour, hatching success, hatchling vigour and early hatching survival is underway. Coastal development is already extensive in Barbados but is of growing significance in other Caribbean islands where hawksbills nest, as well. It is important therefore to conduct research that will increase our ability to assess the environmental impacts of coastal development and enhance our ability to mitigate against them. All nest positions have been digitally recorded using GPS since the 2002 nesting season. This work is continuing with the positions of all beachfront lights also being recorded by GPS. The heights of lights from the ground and their brightness are also determined. This information will be used to show policy makers in a graphic form, how artificial lighting causes concentration of sea turtle nests, often into sub-optimal sections of beach.

Hawksbill females who emerge to nest on developed beaches crawl further on land before nesting than those on undeveloped beaches, with nests being more laterally displaced from the point of emergence than the undeveloped beaches (Harewood & Horrocks 2002). Although larger, heavier species of sea turtles may be more adversely affected by lengthy crawls on land than smaller species like hawksbills, the longer crawl length necessary on developed beaches will nevertheless increase the overall energetic costs of nesting over a whole nesting season. Furthermore, lateral displacement from point of emergence has the potential to have adverse effects on hatchling survival if the nest is made where there is a reef offshore rather than sand. Reefs are likely to harbour more hatchling predators than sandy bottom areas. Research
currently underway is comparing survival rates of hatchlings as they swim away from the beach over reef as compared to swimming away over sand. The microbial environment of the nest is also influenced by anthropogenic factors. For example, construction of walls on the beach interferes with drainage and causes higher moisture content of sand. Landscaping of the beach places soil in contact with sand and increases its organic content. Research is currently underway to investigate the microflora of nests in different locations and how various types of microflora influence hatching success. The functional value of the mucous secreted by the female as an anti-microbial agent is also under investigation.

The high level of beach coverage during the 2002 nesting season facilitated us finding a female who had been satellite tracked in 1998 back to her foraging ground (Horrocks et al. 2001), and has allowed us the rare opportunity to attach a second transmitter to her this year. This work, done in collaboration with the National Marine Fisheries Service (USA), will provide the first data of its kind and help to answer the question of whether hawksbills are as faithful to foraging grounds as they are to nesting beaches. An adult male was also fitted with a transmitter in 2002. Movements of adult male hawksbills are even less well understood than those of adult females. Although he is still offshore of Barbados to date, he is clearly spending most of his time in deep water, because he has not been seen during routine survey dives since he was caught.

Over the past few years, an in-water monitoring programme for hawksbills has been underway. The data collected are increasing our understanding of residency patterns, growth rates and origins of juveniles in our waters. Mitochondrial DNA (mtDNA) analyses of hawksbill tissue samples collected routinely from captured animals show that it is a mixed stock with animals originating from the western and northern Caribbean and beyond. The work is currently being written up for publication. Haplotypes (a set of closely linked alleles inherited as a unit) have begun to show up on foraging grounds that have not been detected on any nesting beach to date. This occurrence may be because the original work on nesting beaches that showed that nesting populations of hawksbills in the Caribbean are discrete (Bass et al. 1996) was based on only 15 samples from each rookery. There is a clear need to supplement this work with additional samples in order to have a chance of detecting rare haplotypes. In 2004, we will be collecting further tissue samples from freshly dead hatchlings found in excavated nests to see if an increased sample size will reveal these rarer haplotypes. The identification of rookery origins is important in the context of developing a regional management plan for hawksbills; a primary objective of the CITES Third Hawksbill Range States Dialogue.

3. METHODS

Conservation and monitoring are facilitated through (1) a 24-hour response to public hotline (cellular phone) reports of nesting and hatching events of hawksbill turtles, (2) all-night patrols of an index beach and (3) nightly patrols of high density nesting beaches. Monitoring therefore requires three sub-teams of personnel, one stationed on the index beach all night, and two mobile teams responding to hotline calls during the night. Whether the nesting or hatching is a public report or is an activity that occurs on an index beach, the same data are collected and standardized forms are completed. Examples of data forms for nesting and hatching events are attached. Methods of measuring and tagging turtles follow Eckert et al. (1999).

Sub-teams patrolling index beaches consist of 4-5 persons per patrol. Sub-teams will depart for beach patrols at 7:30 pm and will return at 4:30 am. The west coast beach stretch is 10 km of beach in total, broken up by headlands and the south coast index beach stretch is 1.5 km. Personnel rest
for 10-20 minutes at each end of the index beach, but are otherwise expected to patrol the beach
to look for emerging females or nests throughout the night, regardless of weather conditions. All
emerging adult female turtles are flipper-tagged (or existing tags are read), and measured using
standard techniques, and their nest locations marked by GPS. The female is photographed. Data
forms are completed for each nesting event. All hatching events are recorded on separate data
forms, a sub-sample of hatchlings are measured prior to release, and nests are excavated to
determine hatching success. Tissue samples from freshly dead hatchlings may be collected for
genetic analyses. Sand and mucous samples may also be taken.

Hotline calls can be reports of nestings, hatchings or strandings. During the height of the season,
there may be 3-5 calls per night and 3-5 calls during daylight hours. For nesting calls, personnel
travel to the beach to tag and measure the turtle, to mark the nest location or move the nest
(using recommended techniques and restricted to circumstances where risks of egg mortality are
unacceptably high), and to ensure that the turtle re-enters the sea safely. Efforts are always made
to inform persons making the report about conservation issues affecting sea turtles and to
encourage them to safeguard/monitor the nest through to hatching. This aspect of BSTP
personnel work is considered to be particularly important. Our experience has been that
discussions on the beach with the general public or tourists have proved extremely effective in
conveying important information and influencing people’s opinions and perspectives about sea
turtles. Follow-up visits to the nest site may sometimes be necessary, if the care-taker
subsequently calls in to report a threat to the safety or security of the nest. Between calls, the
hotline team is expected to check nesting beaches for turtle activities. On many occasions,
hatchling reports are made to the hotline because there has been significant disorientation of
hatchlings caused by coastal lighting during migration of hatchlings from the nest to the sea.
BSTP personnel assist in collecting disoriented hatchlings, determining the nest location,
negotiating with adjacent hotels to temporarily reduce light levels on the natal beach to allow
hatchlings to find the sea, or releasing the hatchlings at an adjacent dark beach stretch.

In-water surveys of hawksbills on foraging grounds are undertaken during the day, one-two
times per week. Untagged animals are hand-caught or netted by project staff and brought on
board a dive boat for processing. Volunteers may help process and record data, but will not
assist with the actual capturing. All animals are measured and tagged, and tissue samples may
be taken for genetic analysis. At some sites, animals are also painted with large numbers or
symbols to allow their subsequent identification without need for recapture. Dive operators and
their SCUBA clientele participate in this aspect of the Project by reporting sighting locations of
marked animals on forms provided.

BSTP personnel are fully trained in all data collection techniques to minimize errors and reduce
inter-individual discrepancies.

4. APPLICATION OF RESULTS

In many parts of the Caribbean, including Barbados, sea turtles are perceived primarily as a
fishery resource and have been exploited for hundreds of years. The research activities of the
BSTP are designed to collect and analyze data appropriate to enhancing conservation initiatives
and to inform policy and action required to recover endangered hawksbills in Barbados and the
Caribbean region. Data provided by the BSTP to the Government of Barbados indicated that the
hawksbill turtle was in serious decline and unlikely to recover in the absence of full protection
from exploitation. The moratorium came into effect in July 1998, and will be maintained until
index beach monitoring indicates that the numbers of nesting female hawksbills in Barbados have recovered to target levels. Research in which the BSTP was an active participant has also shown that hawksbills are highly migratory during their lives and are therefore not the “property” of any one island (Horrocks et al. 2001, Krueger et al. 2003). Effective conservation and management will require, at the very least, a sub-regional integrated approach if population recovery of this Critically Endangered species is to be realized.

The data currently obtained suggest that hawksbill recovery is underway (Krueger et al. 2001). When data have been collected for a sufficient number of years to reveal evidence of a real recovery in sea turtle numbers, the Government may consider a resumption in sea turtle harvest, but at carefully controlled levels and with full protection for nesting females. However, the BSTP continually emphasizes alternative, economically profitable, non-consumptive options for use of the sea turtle resource. In particular, the work of the BSTP has established that there is potential for sea turtle ecotourism in Barbados, which would be of economic benefit to a wider cross section of the Barbadian public than if sea turtle use were exclusively consumptive.

The recovery of the hawksbill population and the potential for sustainable sea turtle ecotourism hinge not only on a ban on sea turtle harvest until numbers recover, but also on the maintenance of critical habitat, particularly nesting habitat. The BSTP plays an ongoing role in identifying the threats to nesting beaches, in promoting the protection of critical habitat and in developing ways in which the threats can be mitigated. The BSTP is regularly consulted by the public and private sectors. For instance, the Coastal Zone Management Unit and the Town Planning Department (Ministry of Planning & Environment) consult with the BSTP as part of the process of environmental impact assessment of coastal property planning permits. This information is also of importance in promoting “best practices” in neighboring Caribbean islands with sea turtle populations, who are seeking to develop tourism as the mainstay of their economies.

The BSTP attempted to address the ubiquitous beach-front lighting problem in Barbados by organizing the First Caribbean Workshop on Sea Turtles and Beachfront Lighting in October 2000 (co-hosted by the BSTP and WIDECAST, USA). Held at a west coast hotel, hoteliers and property managers attending the Workshop were informed about the problem of beachfront lighting for sea turtles, and the environmentally friendly lighting options available. Hoteliers also heard first-hand from a representative of Disney’s Vero Beach Resort in Florida how appropriate beachfront lighting will help their establishments tap into the growing market niche of environmentally-aware tourists. The Workshop culminated in the passing of a Beachfront Lighting Declaration and an agreement to draw up specific guidelines for lighting of beachfront areas adjacent to hotels and villas where there is turtle nesting.

Although there is much work to be done, the follow-up to the Lighting Workshop has been encouraging. A south coast hotel, Coconut Court Beach Hotel, which is located on our Index beach, completed a lighting assessment following the Workshop, and re-positioned, removed or changed all of its lights. Furthermore, the hotel management at Coconut Court Beach Hotel is spearheading a scheme to bring all hotels on this important beach together to tackle the lighting problems. In an effort to increase the value of sea turtles to these hotels and to encourage them to make the necessary financial commitment to making their properties more sea turtle friendly, the BSTP has been working in conjunction with the Barbados Marine Trust (based at Coconut Court Beach Hotel) to permit small numbers of visitors staying at these hotels to watch nesting turtles alongside the BSTP patrols.

Data collected by the BSTP have contributed significantly to the international debate initiated by CITES (i.e., the Hawksbill Range States Dialogues), in response to a proposal from Cuba to re-open hawksbill shell trade. The shell trade was the most significant factor in the precipitous decline of hawksbills that occurred between 1970 and 1990. Dr. Horrocks has attended two
Hawksbill Range States Dialogue meetings (Mexico City, May 2001 and Cayman Islands, May 2002) and the intervening Nesting Beach and In-water Monitoring Protocols meeting (Miami, February 2001) as the Barbados Government representative. She has presented demographic data derived from the long term Barbados monitoring programme and helped to guide the development of protocols that can be implemented successfully by other countries in the region. These data have been compiled with data from other intensive monitoring programmes into a report on status and biology that was presented and accepted by the Parties to CITES at the Conference of the Parties in November 2002, in Chile. This document is available on the CITES website (www.cites.org/eng/prog/HBT/intro.shtml).

In summary, we believe that the sea turtle research and monitoring activities in Barbados that have been supported by Earthwatch for the last 4 years have produced very worthwhile results. Data gathered have been used to guide policy at both the national and international levels and there are good indications that the recovery of hawksbills has begun. Nesting beach monitoring must continue for at least 1 more year in order to obtain the minimum number of data points we need to assess a trend in hawksbill numbers, but our goal is to continue monitoring annually for at least 3 more years. Both the beach and in-water monitoring programmes have allowed us to test interesting hypotheses and will continue to do so, providing us with the information that is needed to manage hawksbill sea turtles in the region wisely and sustainably.

Publications

A number of technical reports and papers and publications have been produced during the four years in which Earthwatch has provided support to the BSTP and are listed in the ‘Appendix’. Also listed are Conference presentations that will either appear in Proceedings or are in the process of being submitted as full-length articles. Since Earthwatch support is for 4 months of the year but activities of the BSTP are year round, it is often difficult to separate work that is attributable solely to Earthwatch support. Acknowledgement is also due to the University of the West Indies, Peter Moore’s Barbados Trust, the Barbados Tourism Development Corporation, the Australian High Commission, the British High Commission, the National Marine Fisheries Service (USA), Hightide Watersports, and private donors.

5. FIELD TRAINING

The volunteers receive an introductory session and slide show on Barbados’ ecology, general sea turtle biology and on the specific research activities of the BSTP (e.g., population monitoring on the nesting beach and in the water, genetics, telemetry), followed in the afternoon by a lecture on data collection and form filling. On-site briefings are conducted at both the first nesting and the first hatching events in order to demonstrate data collection methods. Impromptu sessions occur if volunteers are exposed to opportunistic situations and activities e.g., strandings, hatchling releases inter alia. In their first session, volunteers are given a Safety Briefing and informed about aspects of the Barbados’ culture.
6. VOLUNTEER ASSIGNMENTS

Earthwatch volunteers will be rotated through 3 sub-groups. The 3 sub-groups work during the night (1 index beach, 2 high density beach patrols - one with the hotline).

Group 1: Patrol of Index Beach. The volunteers will patrol the index beach between 8pm and 4am surveying for emerging hawksbill females and for hatching nests. They will participate in measuring the females and reading the tags of previously tagged animals. They will make an assessment of the security of the nest, record the exact location of the nest, and note pertinent environmental characteristics of the site. They will observe tagging performed by the team leader. If necessary, and according to the opinion of the team leader, the nest may be moved to a safer area of beach. At hatching events, volunteers will measure and weigh a sub-sample of the clutch prior to release, and excavate nests. Egg counts will be made and un-hatched eggs will be opened. An assessment will then be made of the developmental stage at which the embryo died. Tissue samples may be collected for genetic analyses.

Groups 2 and 3: Patrol of high density nesting beaches (Duties as above).

All groups will submit data sheets and fill in summary forms for specific data (e.g., beach coverage that night).

All volunteers will have the opportunity to assist with the data collection activities of our in water research programme. BSTP trained staff will SCUBA dive for juvenile hawksbill sea turtles and volunteers will remain on the boat and assist with the data collection (measuring, weighing) of turtles which are caught. One morning will be set aside for this activity during each Earthwatch team.

All teams are likely to encounter nesting, hatchling and juvenile hawksbills. A higher proportion of the work of later teams will involve hatchling turtles than of earlier teams.

7. PROJECT STAFF

Principal Investigators

Julia Horrocks, 46, B.Sc. Reading, U.K. (Zoology/Psychology); Ph.D. University of the West Indies (Aspects of the behavioural ecology of Cercopithecus aethiops sabaeus in Barbados). Presently Senior Lecturer in Dept. Biological and Chemical Sciences, University of the West Indies, Coordinator of the Caribbean Marine Turtle Tagging Centre and Director of the Barbados Sea Turtle Project. Specialises in biodiversity conservation (particularly sea turtles), primate ecology; behavioural ecology. Dr. Horrocks will have overall responsibility for the biological research and conservation activities in which Earthwatch volunteers will be involved. She will introduce the volunteers to the Project and the results to date, and indicate how the volunteers will be contributing to fulfilment of the Project’s objectives. All volunteers should have the opportunity to meet with and interact with Dr. Horrocks at least twice during the team. Organisation of teams and day-to-day logistics will be organised by Barry Krueger and and Jennifer Beggs.
**Barry Krueger**, 41, Associate Diploma of Animal Technology. He has extensive experience with reptiles, small mammals and marine mammals and eight years experience as field director of sea turtle projects (Australia, St. Croix and Barbados). Barry has worked for six full seasons in Barbados as Field Coordinator of the BSTP, and is familiar with all study sites and research activities undertaken by the Project. He has both volunteered on an Earthwatch project (Echidnas in Australia) and worked as a field director for Earthwatch (Leatherbacks in St. Croix with Peter Dutton) before working for the last 4 years as Field Director for the BSTP Earthwatch seasons. Barry is registered to do his M.Phil at UWI (Thesis title: Habitat utilization of juvenile and sub-adult hawksbill turtles (*Eretmochelys imbricata*) on coral reef foraging grounds around Barbados). He is also fully SCUBA trained. Barry will coordinate Earthwatch teams and deal with day-to-day logistics, lead groups on patrols at night as needed and supervise in-water research activities.

**Professional Staff** (will be in the field for the duration of the project)

**Jennifer Beggs**, 26, B.Sc. University of Puget Sound, WA (Biology). Jen has several years of field research and lab work experience with endangered species of reptiles. Jen also has experience with a variety of marine mammals (beluga whales, seals, sea otters), polar bears, and puffins. She has completed four turtle seasons working with the Barbados Sea Turtle Project, and is knowledgeable regarding all project activities, data collection and entry. Jen is currently registered to do her M.Phil. at UWI (Thesis title: Demographics of the recovering population of hawksbill turtles nesting in Barbados, West Indies). She is a certified Divemaster. Jen will assist Barry with the day-to-day logistics and with the in-water tagging aspect of the project.

Additional staff members will be recruited as Patrol Leaders. A total of four of the staff over the season will be UWI M.Phil. or M.Sc. students. All staff recruited will have field experience in sea turtle research and conservation, and will assist Barry Krueger in the day-to-day logistics of looking after the volunteers, as well as leading patrol groups. UWI Undergraduate students may also be employed as field assistants.
FIELD LOGISTICS

8. RESEARCH AREA

Barbados is a coral limestone island located at 13°10'N 59°35' W, about 150 km east of the Windward Islands of the Lesser Antilles. It is 32 km/19.8 mi long and 23 km/14.3 mi across at its widest point. The highest elevation is 340 m/0.2 mi above sea level (Mount Hillaby). The island has many beautiful beaches, both on the rugged and undeveloped Atlantic coast and the calm Caribbean coast. The climate is hot all year round (28-31°C daytime temperatures). The average annual rainfall is about 125 cm/49.2 in, most of it falling in the wet season (June-December). This time period is also the hurricane season in the Caribbean, but Barbados is located sufficiently far south to be missed by most Atlantic storms.

The island was settled in 1627 by the English and remained colonized until independence in 1966. The island now has a democratically elected government and regular non-violent elections. The country boasts a literacy rate of over 95%. The political climate is stable and the economy is driven primarily by tourism and sugar. The majority of Barbadians (about 95%) have African ancestry. The remaining 5% of Barbadian are either of Caucasian or of Asian decent. Race relations are generally good. English with a dialect is the spoken language. Cricket is the national sport, calypso is perhaps the most popular form of music, and the island has its annual carnival (Crop Over) in late July and early August to celebrate the end of the sugar harvest. The country’s history can be traced through many and varied monuments to the past, including an interesting museum.

Much of the island’s original forest was cleared for sugar cane cultivation, but there are interesting remnants to be found in Turner’s Hall woods and the numerous gullies that dissect the island. There are 700 species of flowering plants in the wild. The only indigenous mammals on the island are several species of bats. However, the introduced species include the green monkey (Cercopithecus aethiops sabaeus). There are over 10,000 monkeys in the wild in Barbados. The terrestrial reptiles include several lizards, a worm-like snake and a non-poisonous arboreal snake. The are several sites of ecological interest to visit e.g. Barbados Wildlife Reserve, Graeme Hall Bird Sanctuary, Jack in the Box Gully, Andromeda Gardens, Orchid World, Flower Forest inter alia.

Barbadians enjoy talking about politics generally and opinions are well tolerated. Opinions among Barbadians about the current USA foreign policy are mixed, although not sufficient to alter the average Barbadian’s favourable opinion of Americans. With regard to the Project’s mission and activities, it is necessary to emphasise to volunteers (which is done in the Introductory session) that Barbadians may have different perspectives on the value of sea turtles. These values may change in response to information that local people get about sea turtles, but the Project does not take a totally anti-use stance, if use can be demonstrated to be sustainable.
9. TRAVEL PLANNING

Visa Information

Citizens of the United States, European Union, Canada, Australia, and Japan do not generally need a tourist visa for entry (exceptions exist for length of stay). Citizens of other countries should check with their travel agent or a visa agency for specific visa and entry requirements. Each visitor must have a valid passport and return ticket for travel out of Barbados. A useful website for visa requirements is: http://www.embassyworld.com

Here are some Frequently Asked Questions about visas:

What kind of visa do I need?

Earthwatch volunteers who require a visa for entrance, will need a tourist visa. The Principal Investigator/researcher will have the research permit for the project.

How do I obtain a visa?

You can obtain a tourist visa by contacting the Embassy or Consulate of the country to which you are traveling. If you choose to obtain a tourist visa by directly contacting the country’s embassy, please be sure to leave plenty of time, at least 6 weeks. If you have less than 6 weeks or wish to save yourself trouble, we strongly recommend using a visa agency, which can both expedite and simplify the process. The average cost of a visa is approximately $40–$60 U.S but varies country to country. A visa agency will charge an additional fee (depending on the amount of time it takes to process the application), which you can inquire about directly.

What information do I need to provide?

You will need to send your passport, an application form, 2 to 4 passport-size photos plus payment to the embassy or visa agency (if applicable) at least 6 weeks in advance of departure. Please be sure that your passport is valid for at least 6 months beyond your stay.

What do I write on the visa application form as the “purpose of my visit”?

The purpose of your visit is for vacation, holiday, or travel. Foreign immigration officials do not always understand the concept of a “working vacation” or even “volunteering.” Words such as “working/volunteering,” “research” or a “scientific expedition” can raise questions concerning the country’s foreign labor laws and/or prompt questions about official scientific research permits and credentials, etc. to which volunteers on their own will not be equipped to respond. All required research permits for the project are in place and have been approved by the proper authorities.

What do I write on the immigration form as the “purpose of my visit”?

The purpose of your visit is vacation, holiday, or travel.

What should I write for the place where I will be residing?
List the address of the hotel or project accommodations where you will be staying.

Where can I find more information on visas?

Please see “Helpful Resources” for several web site links related to the visa process.

Visa Agencies

IN THE UNITED STATES

Passport Visa express.com
1911 North Fort Myer Drive, Suite 503
Arlington, VA 22209
Tel: (888) 596-6028, (703) 351-0992
Fax: (703) 351-0995
E-mail: info@passportvisaexpress.com
Web site: http://www.passportvisaexpress.com/

IN EUROPE

The Visaservice
Tel: +44 (0) 20 7833 2709
Fax: +44 (0) 20 7833 1857
Web site: http://www.visaservice.co.uk

Thames Consular Services Ltd
Tel: +44 (0) 20 8995 2492
Fax: +44 (0) 20 8742 1285
http://www.visapassport.com

Travel Agencies

The following agency is familiar with Earthwatch projects and can assist you in making travel arrangements and booking hotels:

FOR US VOLUNTEERS

Please call your Expedition Coordinator to inquire about recommended travel agents for your project.

FOR EUROPEAN VOLUNTEERS

Wexas International
London, UK
Tel: +44 (0) 20 7581 8761
Fax: +44 (0) 20 7581 7679
E-mail: southern@wexas.com
Quote code: EWE01/02

STA Travel
Oxford, UK
Tel: +44 (0) 1865 792800
For discounted student and youth fares, we recommend the following agencies which specialize in student discounts:

STA Travel,
U.S.: (800) 781-4040
U.K.: +44 (0) 1865 792800
http://www.statravel.com

FOR AUSTRALIAN VOLUNTEERS

The recommended travel agent is familiar with Earthwatch projects, is in contact with the Australian Earthwatch coordinators and gives a discount where possible to Earthwatch volunteers. She is able to organise travel and travel insurance for volunteers Australia-wide.

Carlene Harlock
Shop 2, 250 Flinders Street
Melbourne Vic 3000
03. 9663 6266
Fax: 03 9663 5100
E-mail: carlene_harlock.vic@flightcentre.com

If you notify your Earthwatch Coordinator prior to contacting this travel agent, your rendezvous information will be forwarded.

Cancellation Insurance

We highly recommend trip cancellation insurance which will help cover your airfare if you are unable to travel, or the expedition is cancelled. Earthwatch does not reimburse airfare. Contact your nearest Earthwatch office for details on cancellation insurance.

Other Advice / Information

- The local currency is: Barbados dollar (BDS$1=US$0.50). US$ and sterling can be exchanged at the airport, or in any bank. Traveler’s cheques are widely accepted.

- The time zone is: UTC/GMT -4 (-5 in summer)

- Barbados has strict laws against illegal drugs, including marijuana. Penalties are severe and consist of large fines and/or prison sentences. Violations of law are punishable by Barbados standards with no recourse to foreign courts or attorneys. You may be dismissed from the project if you choose to violate these laws or related project rules in accordance with Earthwatch’s Rights and Responsibility.

- Barbadians enjoy talking about politics generally and opinions are well tolerated. Opinions among Barbadians about the current USA foreign policy are mixed, although not sufficient to alter the average Barbadian’s favourable opinion of Americans. With regard to the Project’s mission and activities, it is necessary to emphasise to volunteers (which is done in the Introductory session) that Barbadians may have different perspectives on the value of sea turtles. These values may change in response to
information that local people get about sea turtles, but the Project does not take a totally anti-use stance, if use can be demonstrated to be sustainable.

Volunteers Under 18 Years of Age

In an effort to prevent international child abduction, many governments have initiated procedures at entry/exit points. These often include requiring documentary evidence of relationship and permission for the child’s travel from the parent(s) or legal guardian if not present. Having such documentation on hand, even if not required, may facilitate entry/depature.

In addition, airlines may also have documentation requirements for unaccompanied minors. Parents of minors are responsible for checking with each airline that their child will utilize to insure sufficient documentation. This could include a copy of a birth certificate or a notarized letter stating that the minor has his or her parent’s permission to travel alone.

10. ITINERARY

Day 1  Volunteers will arrive from many different locations at different times of the day and night. Persons arriving from the UK will usually arrive in the afternoon; persons from the US may arrive in the afternoon or evening, dependent on flight route. This variation means that volunteers will be arriving throughout the day. Those arriving early can spend the afternoon relaxing at the expedition accommodation and the nearby beach, or shopping (grocery, pharmacy, souvenir stores, banks are all within 1 km of the accommodations). Nearby supermarkets stay open until 8 pm. BSTP staff will be at the accommodations to welcome volunteers, prepare that evening’s meal, and help settle volunteers into their rooms. Given the staggered arrival times, the evening meal will be provided at 6 pm. Late arrivals there will have food made available for self-service.

Day 2  Lectures on Barbados wildlife, sea turtle biology, BSTP activities, first training session interspersed with time for swimming and settling in. First night patrols, on-beach briefings.

Days 3-11  Night patrols as assigned. On-beach briefings. One morning scheduled on dive boat for in-water research.

Day 12  Taxi to airport. Departure in morning or afternoon.

Afternoons are generally free. There are many recreational activities that volunteers can involve themselves in, including recreational diving, visits to National Trust properties, walking tours, cultural events inter alia. For those interested in diving there are many locations to choose from. You can try Hightide Watersports (www.divehightide.com). Staff can assist in recommending interesting sites and activities.

Volunteers should consult a travel guidebook for information on local attractions. See "Helpful Resources."
11. **Daily Schedule**

Volunteers should be aware that schedules can and do fluctuate. Weather and work conditions can affect the daily schedule. Should this situation arise, your cooperation and understanding are appreciated.

**Night patrols:**

- **7:30 pm – 4:30 am** Night patrols. Volunteers will either walk to the beach or be transported to undertake beach patrols.
- **4:30 am** Leave beaches around 4 am to be back at accommodations by 4:30am to sleep.
- **Midday** Rise and eat self-serve breakfast/lunch. Afternoon free.
- **6:00 pm** Dinner (main meal) & briefing on night’s activities.
- **7:30 pm** Begin night patrols.

12. **Team Development**

There will be many opportunities for volunteers to interact with each other and with staff during patrols. All meals will be eaten in a communal dining area. Volunteers will be taken out one night to a local restaurant/bar for a meal (e.g., Fishermen’s Pub, Oistins Fish Fry). An island tour, with picnic lunch, tailored to the interests of the group will be planned for one afternoon. This visit could include the Barbados Wildlife Reserve, the Graeme Hall Bird Reserve, a walk in a gully, or a visit to a historic property.

Entrance fees to attractions will be at the volunteers’ expense.

13. **Accommodations**

Accommodation will be provided in a colonial house located close to the index beach within the historic Garrison area. The house has a mature, well-tended, shady garden and a large verandah.

Volunteers will be accommodated in large, airy shared bedrooms, with 2-4 people per room. Couples can often be accommodated, but it is not a guarantee. Kitchen and bathroom (with flush toilets and showers) facilities, and living areas will be shared. All bedrooms are clean, with basic furnishings. Pillows and sheets are provided but volunteers should bring their own towels. Volunteers may bring electronic equipment but it should be properly insured against theft, loss etc. Electricity is 115/230 volt 50 hertz cycle; most are two pin plugs. Most electrical equipment will need a transformer.
14. FOOD

Breakfast and lunch will be prepared by volunteers using food supplied in the kitchen (e.g., cereal, milk, bread, tea, coffee, margarine, eggs, bananas, tuna, cheese, hot dogs). BSTP staff will do the food shopping. Volunteers will be expected to clean up after their meal preparations. The main meal (dinner) on the first night will be prepared by staff. Thereafter, the main meal will be prepared for 6:00 pm by volunteers on a rotational basis. Volunteers may want to bring along a favorite recipe, but nothing requiring elaborate ingredients. Cleaning up after meals will likewise rotate. **Fresh fruits and salad vegetables are not plentiful and are expensive in Barbados. They will be available but cannot be provided in unlimited supply to volunteers.** Meals will most likely be prepared from items such as chicken, fish, pork, pasta, rice, lentils, tinned vegetables (tomatoes, corn) and fresh vegetables. **Given that volunteers are cooking on rotation, accommodating vegetarians and others on special diets will be challenging, but reasonable effort will be made to accommodate.** One evening meal will be at a local restaurant.

Here is a sampling of the foods you might expect in the field. Please bear in mind that variety depends on availability. This list is intended to provide a general idea of food types. It is very important that volunteers be flexible.

**Breakfast:** Cereal, milk, bread, tea, coffee, margarine, eggs

**Lunch:** Bananas, tuna, cheese, hot dogs

**Dinner:** Chicken, fish, pork, pasta, rice, lentils, tinned vegetables (tomatoes, corn) and fresh vegetables

**Snacks/Other:** Snacks are not provided. There are however, plenty of places for volunteers to buy their own snacks.

**Beverages:** Powdered juices, occasionally soft drinks, water, tea, and coffee.

**Special Dietary Requirements**

Note: Please alert your Earthwatch Expedition Coordinator to any special dietary requirements as soon as possible (e.g., diabetic, lactose intolerant, etc.). Accommodating any special diets is not guaranteed and can be very difficult due to availability, location and local conditions.

Special note to vegans and strict vegetarians: Please be aware that it is often difficult to accommodate strict vegetarians and vegans. It may be possible to get meatless meals but vegans and strict vegetarians may have a problem avoiding animal products altogether. If this poses a problem, then participation on an Earthwatch expedition should be seriously reconsidered.
15. PHYSICAL CONDITIONING

Please show this section to your physician when he/she is completing your health statement.

To the examining physician:

Your patient has volunteered to join the field research team which has specific physical demands of which you and your patient should be aware. We need your accurate evaluation of your patient’s ability to meet the conditions detailed below in order to safeguard his/her health and safety, and ensure that s/he can participate fully and effectively.

Overview

Walking on soft sand for 5+ hours is very tiring. Individuals should be physically fit enough to walk the relatively long distances expected of them on the index beaches, remembering that walking on sand is much more difficult than walking on hard level surfaces. Volunteers should also be capable of climbing over boulders and other small obstacles. There are well-stocked pharmacies in Barbados, but persons should bring their own prescription medicines with them. There is a full-facility hospital in Bridgetown (less than 40 minutes from any part of the island) that can deal with normal emergencies (heart attacks, traumas etc). Only serious head injuries may require evacuation out of Barbados. Mosquitoes and sand flies can be a nuisance, especially if a person is allergic to bites, and volunteers are advised to come prepared with effective repellants and medication if required. It is recommended that volunteers bring sandals or sand shoes to wear on the beach. It is very difficult and tiring to walk in flip-flops. Make sure that the sandal has a back strap to keep your heel in the shoe.

Although swimming is not required, the ability to swim and snorkel would greatly enhance the volunteers’ personal experience. Volunteers who wish to SCUBA dive can do so in their free time only and will need to present a c-card. Diving is a physically demanding activity with inherent risks. You are responsible for ensuring your own ability and fitness for diving. Barbados has a decompression chamber with fully trained staff.

General Conditions

Humidity 60% to 85%

Temperature Range: 22°C/71°F (night) to 31°C/87°F

Altitude Sea level to 1,122 ft/341 m

Rainfall Approx 60 inches per year

Climate and terrain of the research site

The beach work will be done during the night when the temperatures are cooler, but require good night vision. Volunteers carry lightweight backpacks. The beaches are gently sloping, making walking slightly “lop-sided.” This slope can sometimes aggravate old injuries etc. Sand is a difficult surface to walk on. The patrols are not strenuous for fit persons, but walking over sand at the moderate pace set by patrols is tiring. Volunteers who are overweight or in poor physical condition would find the patrols strenuous. Persons must also be prepared to occasionally clamber over boulders and other obstacles.
June through December is the rainy season.

**Physical Demands**

<table>
<thead>
<tr>
<th></th>
<th>Workload/Intensity</th>
<th>Time (hours per day)/ #of days per team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting</td>
<td></td>
<td>2 hours/12 days per team</td>
</tr>
<tr>
<td>Bending/Digging</td>
<td>Necessary when excavating nests (0.5-1.0 hr per nest)</td>
<td></td>
</tr>
<tr>
<td>Hiking</td>
<td>Recreational</td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td>Moderate to hard dependent on fitness level</td>
<td>5+ hours on sloping beaches with soft sand. Breaks from walking are taken when nests or turtles are found/12 days</td>
</tr>
<tr>
<td>Carrying</td>
<td>Small, lightweight backpack (personal belongings: water, insect repellent, camera). Buckets or boxes of eggs.</td>
<td></td>
</tr>
<tr>
<td>Swimming</td>
<td>Recreational</td>
<td></td>
</tr>
</tbody>
</table>

**Medical Conditions of Special Concern**

Anyone unable to walk unassisted, or is significantly overweight, a heavy smoker or drinker, or has poor night vision (or fear of the dark!) will not be able to participate in this project. Diabetics without previous experience of how physical exertion in a hot climate with a new diet will affect their level of control are not advised to volunteer. If you have any condition that is aggravated by heat or exertion, you should consult a physician. Individuals with poor agility or back problems precluding bending and digging should consider their participation carefully.

**Potential Hazards**

There are few potential hazards:

- Biting sand flies and mosquitoes (repellents are essential).
- Beach worm (rare and easily treated). This is a nematode that can infect individuals’ feet when they walk on the beach.
- Poisonous plants that can be easily avoided.
- Sunburn, heat-related illnesses, and dehydration are all avoidable with proper gear and drinking large quantities of water.
- Hurricanes (rare). Barbados is well prepared for hurricane emergencies.
- The following are present in some portions of Barbados: typhoid, hepatitis B, cholera, dengue fever, leptospirosis, Venezuelan equine encephalitis and rubella.
**Proximity to medical care**

Is there a physician, nurse, or EMT on staff?

No, but a well equipped Doctor’s Practice is two minutes from Geneva.

Staff certified in CPR (Cardiopulmonary Resuscitation), First Aid, or other safety training (i.e. Wilderness First Responder, Water Safety, etc.)?

Yes, Barry Krueger and Jennifer Beggs are certified in Medic First Aid through the PADI rescue diver course.

What is nearest hospital location?

Queen Elizabeth Hospital, in Bridgetown. Tel: +1 246 436-6450 (about 2 km from Geneva).

Time to reach?

10 minutes from Geneva (accommodations); maximum of one hour from anywhere on the island.

**16. MEDICAL ADVICE**

**Inoculations**

The following are recommendations only. Health conditions around the world are constantly changing, so keep informed and consult your local travel health clinic or the Center for Disease Control website. Medical decisions are the responsibility of each volunteer. Please consult your physician, your local Public Health Department, or the resources listed below for the latest health information for travelers.

<table>
<thead>
<tr>
<th></th>
<th>Required for Entry</th>
<th>Recommended for Health Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polio</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tetanus/Diptheria</td>
<td>X (up to date)</td>
<td></td>
</tr>
<tr>
<td>Typhoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>X - if traveling from countries or region where it is endemic, a Certificate of Vaccination is required.</td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Is Malaria present at the research site? No

Tuberculosis (TB): The World Health Organization (WHO) estimates that one third of the world’s population is infected with the bacterium (*M. tuberculosis*) that causes tuberculosis (TB). Incidence of tuberculosis is higher in developing countries, particularly in Asia, Africa, the Caribbean and Latin America. In general, approximately 10% of persons infected with M. tuberculosis are at risk for developing active TB during their lifetimes. TB is considered highly treatable with
medications that are of relatively low toxicity and cost. Volunteers returning from developing countries are encouraged to have a (PPD)-tuberculin skin-test to screen for potential infection.

These recommendations are for this project site only. Please consult your physician for guidance on inoculations if you intend to travel to other parts of the country.

Resources
Earthwatch recommends that you consult your local public health department or one of the following resources for the latest health information for travelers.

**US ONLY**

Centers for Disease Control  
Atlanta, GA, U.S.A.  
Phone: (800) 311-3435 or (888) 232-3228  
Website: http://www.cdc.gov

**UK ONLY**

Hospital for Tropical Diseases Healthline  
Phone: 0906 1 337733  
(calls are charged at 50p per minute)

MASTA Travelers’ Healthline  
Phone: 0906 8 224100

**AUSTRALIA ONLY**

The Travel Doctor – clinics Australia wide  
Travel Doctor Hotline: 1300 658 844  
http://www.tmvc.com.au

**GENERAL INFORMATION**

Disease Outbreaks:  
http://www.who.int/disease-outbreak-news/  
or  
http://www.istm.org/news.html

---

17. **EMERGENCIES IN THE FIELD**

The beaches are largely lined by residences and hotels. Patrols can seek safety/help in these places. All patrols also have mobile phones to call for help. All staff and volunteers have a card with emergency numbers, including the PIs. The PI will be called and advice sought in all cases. All patrols have access to a vehicle within minutes. In an emergency where it is considered dangerous to move the injured person, the emergency services will be called and the person will be taken to the hospital. If it is considered that transport to the hospital by the patrol vehicle is quicker and the person can be moved without causing further injury, this form of transportation
may be used to minimize the waiting period before treatment. If the emergency occurs on the east coast, the time taken to get to hospital can be substantially reduced by transportation in the patrol vehicle. A first aid kit for minor cuts is carried by each patrol.

Emergency contact number at Earthwatch headquarters in the U.S.: +1 (978) 461-0081.

After business hours, leave your message on the automated answering service. State that you have an emergency communication and leave a clear message with the name of the expedition, your name, location you are calling from, and if possible, a phone number where you can be reached. An Earthwatch staff person will be paged and will respond to your call.

International Evacuation Insurance

UNITED STATES OFFICE:

The travel medical and evacuation insurance, coordinated by ISIS Assistance, is mandatory for all Earthwatch volunteers while they are on an Earthwatch expedition anywhere in the world. The insurance covers volunteer travel medical risk, including medical expenses and medical evacuation, while you are traveling with Earthwatch overseas or on an expedition within your home country. ISIS Assistance will also facilitate evacuation from the project site in the event of an emergency. Without insurance, the costs of such measures can be on the order of US$20,000 to $50,000.

A detailed description of the Earthwatch Volunteer Travel Medical Insurance Program policy will be sent with this briefing. The policy is summarized in a user-friendly questions answer format. Please contact your Expedition Coordinator if you have further questions.

Earthwatch Institute’s insurance provider, ISIS Assistance, provides a 24-hour emergency hotline for the use of insured persons under the Earthwatch program. ISIS Assistance can help with medical emergencies, doctor and hospital selection, obtaining additional medical options, or medical translation problems. ISIS Assistance is backed by International SOS and by Global Medical Management, who provide emergency medical evacuation and rescue services.

In an emergency - If you are calling from outside of the US, the number to call is +(44) (20) 8762 8015. You may call this number collect.

In an emergency - If you are calling from inside the US, the toll-free number to call is 1-888 422-4747.

Basic coverage is valid in the country of your Earthwatch expedition, and during international travel to and from your expedition. For volunteers on Earthwatch expeditions in their own country, coverage begins when your group forms for the expedition, and ends when the group disbands. Options are available for volunteers who would like to extend the period of coverage, increase insurance amounts or purchase additional cancellation or baggage insurance.

EUROPEAN OFFICE:

Earthwatch Europe offers travel and medical insurance provided by Royal & SunAlliance. In the event of medical assistance or an evacuation being necessary, ISIS Assistance will be notified. ISIS Assistance will coordinate the evacuation in conjunction with International SOS.

FOR ALL OTHER VOLUNTEERS:
In addition, our affiliate offices in the Australia and Japan have recommendations for their volunteers. Please contact your nearest Earthwatch office for more information. You may also try the following website which lists several travel insurance providers. Click on the "Travel Insurance" link, which is located on the right in a box called "Healthy Travel Store" (just under the Visa sign). Web site: http://www.travelhealth.com/home/

18. **WHAT TO BRING**

Note: Do not bring more luggage than you can carry and handle on your own. We recommend that you pack a carry-on bag with an extra set of field clothing and personal essentials in the event that your luggage is lost and/or takes several days to catch up with you.

There is no baggage limit outside of that imposed by airlines. One suitcase and a carry on is perfectly adequate.

**General Considerations**

It is recommended that volunteers wear lightweight long trousers on the beach, but if short trousers are preferred, they should be at least knee length. Very short, short pants and low-necked t-shirts will attract unwanted attention to female volunteers on the beach and look unprofessional.

**Cultural Considerations**

Beachwear should not be worn anywhere except on the beach. It is considered inappropriate to go into supermarkets, and on the street in swimwear. On the beach you should wear conservative (not revealing) clothing. Further information on cultural norms will be provided in the initial briefing session.

**Extreme weather:**

Occasionally heavy rain storms.

**Required**

**Clothing/Footwear for Fieldwork**

- Light weight, quick drying, long-sleeved shirts and pants/ trousers (these may be useful for insect protection).

- **Well worn in** and comfortable walking sandals, sand shoes or track shoes that you do not mind getting wet. There may be sharp objects in the sand and you’ll need to scramble over rocks.

- Light-weight waterproof jacket

- Knee-length short trousers/shorts (no short-shorts)

- T-shirts (short-sleeved shirts, high neck, cover abdomen); no tank tops, deep V-necks, or half-shirts.
Clothing/Footwear for Leisure

- Casual wear for restaurant visit
- Comfortable shoes/sandals

Field Supplies

- Small daypack/rucksack for patrol use
- Drybag or plastic sealable bags (good for protecting equipment such as camera from dust, humidity, and water)
- Insect repellant
- Water bottle(s), at least two refillable 1 L bottles.
- Small flashlight or headlight (no halogen bulbs)
- Sunscreen with a high SPF and preferably waterproof/sweatproof
- Sunshades/sunglasses
- Hat with wide brim

Personal Supplies

- Towels
- Personal toiletries (we recommend bringing biodegradable soaps and shampoos)
- Antibacterial wipes or lotion (good for “washing” hands while in the field)
- Personal first aid kit (anti-diarrhea pills, antibiotics, antiseptic, itch-relief, pain reliever, bandages, moleskin, etc.)

Miscellaneous

- Spending money (traveler’s cheques rather than cash). There are ATMs where credit cards and check cards can be used.
- Camera, film, extra camera battery
- Snorkeling gear (or SCUBA) for free time activities. If volunteers plan to snorkel during free time, bringing one’s own mask and flippers is recommended, as hire can be expensive.
19. HELPFUL RESOURCES

- Barbados Sea Turtle Project website: http://www.barbadosseaturtles.org
- Useful Visa Information website: http://www.embassyworld.com
- Lonely Planet travel guidebooks and online travel site - http://www.lonelyplanet.com. Their guidebooks can be purchased from their web site.
- The Rough Guide travel guidebooks and online travel site - http://travel.roughguides.com/
- Country Reports. Country information from around the world. Web site: http://www.countryreports.org
- U.S. State Department - http://www.state.gov/
- UK Foreign Office travel advice - http://www.fco.gov.uk/travel
- Telephone Dialing From and To Anywhere - http://kropla.com/dialcode.htm
- Online Unit Conversions - http://www.onlineconversion.com/
- ATM Locator: http://visaatm.infonow.net/bin/findNow?CLIENT_ID=VISA
  http://www.mastercard.com/carholderservices/atm/
- Heat Index (temperature, dewpoint and relative humidity) - http://www.weatherimages.org/data/heatindex.html
- [Exhaustive List of Weather Resources](http://cirrus.sprl.umich.edu/wxnet/servers.html)
- Dive Master Insurance Consultants Ltd [http://www.dive-master.net](http://www.dive-master.net)

### 20. THE READING LIST


### LITERATURE CITED


