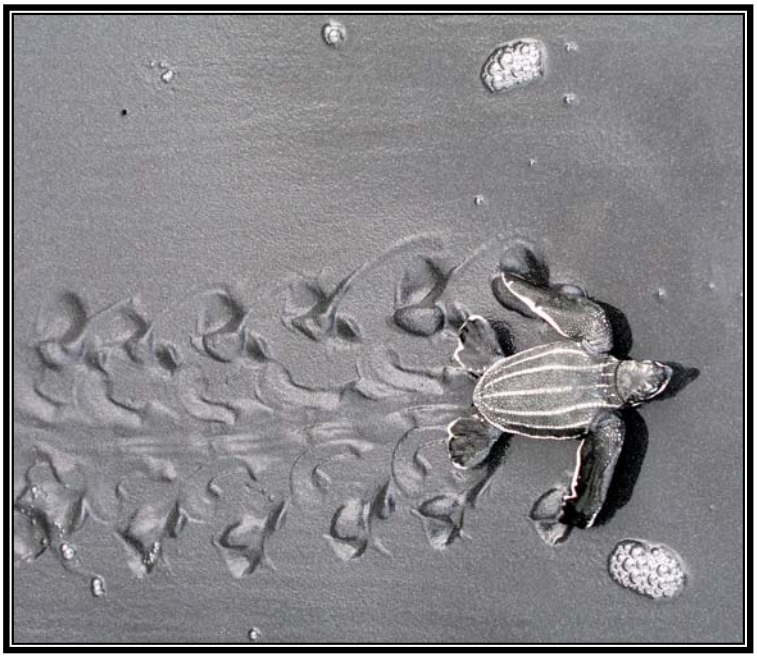
"ROSALIE SEA TURTLE INITIATIVE" (RoSTI)

A project of the
Wider Caribbean Sea Turtle Conservation Network (WIDECAST)

BIENNIUM PROJECT REPORT 2004-2005



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We are profoundly grateful for the welcoming and ongoing encouragement of the people of Dominica! A program such as this can only be successful if it has the support of all sectors of society, including local communities, government agencies, tourism sectors, and the media. It would be impossible to credit everyone who participated meaningfully in the project, and we must apologise in advance to anyone we have inadvertently left out.

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We are also deeply grateful to other members of the WIDECAST network for providing training and field experience to project staff and Forestry officers. These include the Nature Seekers (Dennis Sammy, Manager) in Trinidad, the Barbados Sea Turtle Project (Dr. Julia Horrocks, Director. We are also grateful to Dr. Horrocks and Dr. Robert van Dam (Sea Turtle Conservation Bonaire) for their comments on the initial research design.

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Executive Summary and Major Recommendations

The Rosalie Sea Turtle Initiative ("RoSTI"), a partnership between the Wider Caribbean Sea Turtle Conservation Network (WIDECAST), the Government of Dominica, and the communities of the South-East coast, achieved success on many fronts in 2004 and 2005. The project continues to demonstrate what can be accomplished when the cooperation of stakeholders at all levels is achieved, and indeed how much more could be done if such cooperation were to be sustained over time.

From a science standpoint, RoSTI has demonstrated that the major nesting beaches of the South-East coast can be regularly patrolled and surveyed to document the number (and species) of sea turtles nesting, their reproductive success (including nest fate), and major threats to their survival. Project staff documented three species of sea turtle (the Leatherback, Green turtle, and Hawksbill) nesting on Rosalie (Coffee) and La Plaine (Bout Sable) beaches. Leatherback nesting peaked in May and early June, followed by Green turtles (peak: late July and early August) and Hawksbills (peak: late September and early October). As is the case elsewhere in the eastern Caribbean region, Hawksbills showed the least defined nesting season, presumably nesting in low densities throughout most of the year.

All sea turtles nest multiple times per season: generally an average of 3-7 nests per season, and in the case of Leatherbacks the total may be 12 or more in a single reproductive season. Research throughout the world has shows that adult females repeatedly return to the same nesting area (at 2-7 year intervals) to nest. Based on tagging records, we know that this can continue for two decades or more -- meaning that each adult female produces thousands of eggs and is vitally important to the survival of her species. Hopefully in future years we will continue to see our tagged turtles return! Sadly, this will not be the case for at least 6 Leatherbacks that were tagged by RoSTI staff during nesting and later killed (3 in 2003, 2 in 2004, 1 in 2005) as they came ashore to nest at La Plaine, just to the south.

A total of 26 turtles received identifying flipper tags (tags were provided by WIDECAST's regional Marine Turtle Tagging Centre in Barbados) in 2004, including 18 Leatherbacks, 2 Green turtles, and 6 Hawksbills. In 2005, a total of 12 leatherbacks, 1 Green and 1 hawksbill were observed and flipper-tagged. In 2004, 11 nests were confirmed and 6 nests were characterized as "suspected nests" (based on field characteristics) but could not be confirmed before beach erosion took its toll. In 2005, there were 20 confirmed nests and 19 suspected nests.

We cannot fully estimate the number of turtles nesting in Rosalie Bay because tagging can only be accomplished during all-night beach patrol (sea turtles nest at night) and only Rosalie Beach was consistently patrolled at night. In the case of La Plaine, nests and suspected nests were documented during early morning beach surveys in 2003, which were later expanded to include nightly patrols in 2004 and 2005. Based on the data obtained, we estimate a nesting population (all three species, combined) of fewer than 20 adult females, of which a half-dozen Leatherbacks are known to have been killed. We also estimate that fewer than half of all eggs hatch in the study site, due to natural cycles of erosion and also due to illegal egg poaching, especially at La Plaine.

The illegal killing of egg-bearing females is clearly the most important threat to the turtles, and beach erosion is clearly the most significant threat to their young.

From a community standpoint, RoSTI demonstrated that there is considerable untapped passion for sea turtle conservation in the coastal communities of the South-East region, as well in Dominica as a whole.

Hired staff, including former poachers, were thoroughly and professionally dedicated to the task of beach patrol and data collection from the very beginning. Their participation, often extending beyond salaried hours and duties, was the heartbeat of the project and the reason that illegal killing was immediately and substantially reduced in the study site. [No sea turtle has been killed on Rosalie Beach since May 2003!] The participation of local staff also encouraged others, including local youth, to volunteer on the beach, to participate in beach clean-ups, to serve as interns (conducting national surveys, for example), or simply to come to the beach to see a live sea turtle – something most members of the community had never done.

The larger (national) community also exhibited a genuine interest in the sea turtles' plight. This was demonstrated by frequent requests to participate in the beach patrol, expressions of opinion during call-in radio shows, the incessant ringing of the *Sea Turtle Hotline* (a mechanism enabling citizens to report nesting, hatching, stranding, and illegal acts), the support of local business (cash, advertising, in-kind services), requests by schools for presentations, and the times RoSTI staff were stopped in the street and asked questions about sea turtles. In a 2003 national Public Awareness Survey of nearly 200 Dominicans, fully *73% had never seen any species of sea turtle nest on the beach*, which certainly explains the wonder and awe of residents who joined RoSTI staff to see the ancient ritual for the first time.

Based on everything we've learned during Phase I of the project (2003-2005), we offer the following recommendations. See "Discussion with Management Recommendations" for further recommendations and more detail on the recommendations summarised here.

Extending Beach Coverage- Rosalie Bay was the geographic focus of the project. Research outside of this area was conducted in partnership with Forestry staff and other local communities, including Soufriere, Scott's Head, Salisbury, Calibishe, Woodfood Hill, several communities in North Eastern Dominica, and Portsmouth, among others. The relatively low rate of return nesters (i.e. observing a tagged turtle more than once) across all species suggests that more attention be given to the patrolling of other potential nesting beaches, especially those in relatively close proximity to the study site. We recommend early morning foot patrols of other potential nesting beaches, selected based on information provided by informed residents and existing government databases. As Forestry officers currently undertake habitat surveys on an island-wide basis approximately every three months, we recommend that RoSTI staff participate in and support these surveys to the maximum extent possible.

Nest Relocation- Of the three sea turtle species encountered at Rosalie Bay, the Leatherback nested most consistently near the high-water mark. Most nests, both confirmed and "suspected", continue to be lost to erosion on Rosalie Beach and at times eggs were seen laid amongst rocks on La Plaine. This despite the fact that most are carefully relocated by RoSTI staff to higher (safer) areas of the beach platform. It is a recommendation that based on beach profile data available to date, as well as on the collective experience of RoSTI staff and beach patrollers, "safe zones" suitable for the relocation of otherwise doomed nests be *identified prior to each nesting season*. The site should be relatively safe from both ocean storm surge and inundation from local rivers.

Communication and Shelter- Recognising the importance that community beach patrollers be provided with cell phones, this was done (and the phones serviced, as well) in both 2004 and 2005. The result was an increase both the ability of beach patrollers to communicate with RoSTI Project Managers, and with enforcement personnel in the event of an emergency or the occurrence of illegal activity on the beach. It is a recommendation that field staff continue to be provided with cell phones, and it is further a recommendation that every effort be made to construct a 'turtle hut' on La Plaine beach, similar to the

popular and useful structure already in place on Rosalie Beach. Currently, turtle watchers and patrollers have nowhere to rest or wait while waiting for a chance to see a nesting turtle on La Plaine beach.

In-water Research- A Turtle Sighting and Reporting Network, established in 2003 in collaboration with Dive Dominica, local boat captains, and other relevant experts, remains in effect. It is clear from observational and anecdotal information that much could be learned from a more formal investigation of sea turtle distribution, abundance and behaviour in offshore waters. It is a recommendation that RoSTI staff design and prepare the methodology for in-water research at selected sites around the island (including Rosalie Bay). As WIDECAST will be designing in-water census programs to study foraging populations in selected Eastern Caribbean islands during 2006-2008 as a pilot project with UNEP funding, we recommend that Dominica be included in this programme.

Habitat protection- Regulated multiple use areas, buffer zones, and various forms of habitat protection are among the tools that managers and concerned communities emphasise when seeking to safeguard and restore depleted natural resources. In the case of sea turtles, where poaching continues to pose a serious threat, it is a recommendation that a "Rosalie Bay Reserve" (RBR) be considered, perhaps under the authority of the Fisheries Act, to encompass the entirety of nesting habitat from the Rosalie River to the southern boundary of La Plaine Beach and from the low water mark to the line of permanent vegetation.

The laws of the Commonwealth of Dominica protect the right of public access to the island's coastal beaches, and therefore any access and/or use restrictions associated with the beaches should be defined by regulations governing the RBR. A Management Plan for the reserve should define a Buffer Zone between the line of permanent vegetation (the landward boundary of the RBR) and the landward boundary of the natural rock dune at Rosalie (Coffee) Beach. It is a recommendation that no physical development should occur within the RBR or within the Buffer Zone. The natural integrity of the banks of the Rosalie River should also be protected from degradation, perhaps as part of the Buffer Zone.

Similarly, it is a recommendation that La Plaine Beach be designated as a conservation area of some kind, so that conditionalities specific to the protection of sea turtles could be enacted. For example, visitors to the beach (for the purpose of 'Turtle Watching') would be required to pay a local guide, beachfront lighting would be controlled, the beach would be regularly cleaned, etc. In addition, the conservation area would generate additional awareness of the plight of Dominica's sea turtles and the laws already in place that safeguard pregnant females and their eggs and young.

Poaching- Attempts to counteract poaching must continue to be a priority since, if left unchecked, the entire nesting population of Rosalie Bay could be destroyed. It is a recommendation that RoSTI staff and volunteers provide timely and complete information to law enforcement officers concerning any illegal activity of which they are aware, and that RoSTI staff offer their full and complete cooperation in any investigation of these crimes. It is further a recommendation that, particularly where poaching is heavy, RoSTI staff investigate options available at the community level, including funding for indigenous industries or livelihood generation, and collaborate with relevant local and national agencies and groups to explore opportunities to provide poachers with alternative means of income.

Education and Outreach- The 2003 RoSTI program focused on the education of children inside the classroom though its School Programme; this outreach continued, upon request (2-3 presentations per month) during 2004 and 2005. We recommend that RoSTI continue its Schools Programme (directly involving community teachers and other educators), and that a RoSTI Internship Programme, started in

the latter part of 2003 but never consolidated, be fully developed. RoSTI was designed to be run by local managers, which may logically be drawn from the Intern Programme! It is further a recommendation that the RoSTI Internship Programme strengthen ties with the island's Youth Division, which has already been an invaluable asset to RoSTI, and, like RoSTI's relationship with Fisheries and Forestry officials, it represents a sterling example of what RoSTI should continually strive for; that is, real and meaningful cooperation between groups and agencies that share the same vision.

Educational Materials- Outreach continues to involve teaching people (residents and visitors alike) about sea turtles, and involving them in stewardship and conservation initiatives. We recommend that RoSTI staff develop additional picture materials, particularly species identification sheets, posters, bookmarkers and thematic brochures. These materials will also be useful in schools where RoSTI staff work in partnership with local teachers. It is further a recommendation that materials be developed specifically for sharing with policy-makers. For example when visiting Village Councils, small packages or folders should be available for each Council member to keep.

'Turtle Watching' Venture- It is a foundational objective of the RoSTI project to "raise awareness of the biology and status of depleted sea turtle populations, as well as to encourage interest on the part of Dominicans to become involved in a locally run 'Turtle Watching' venture." Such a venture has the potential to provide sustainable livelihoods for community members, encourage leadership and entrepreneurial skills, and complement existing marketing strategies for Dominica as a tourist destination. It is a recommendation that RoSTI staff, WIDECAST experts, and other partners continue to work with community leaders and natural resource authorities to design an initiative that will accomplish conservation and community development goals.

It is important that community capacity be developed in the area of tour-guiding; the alternative is that hotel and other tourism entities will elect to send their own "guides" to the beach, thus diverting an income-generating activity from the community, creating competition and chaos on the beach, and leaving Government with the challenge of training, permitting, and regulating an open-access field of tour operators. Visitors to Dominica should be made aware that there are specifically trained guides from the local community who specialize in Turtle Watching, that the activity is regulated and permitted, and that profits are returned to community-based conservation initiatives. WIDECAST will assist in building this capacity, based on successful operations elsewhere in the region.

Media Considerations- It is a recommendation that the project continue monthly turtle reports on the radio, and with a continuing emphasis on featuring Dominicans along with RoSTI staff. The same is true for television, where opportunities to feature community beach patrollers and others directly involved in the project should be sought. General "media", in the sense of public visibility for overall sea turtle management issues, is also needed. For example, it is a recommendation that emphasis be placed on the posting of sea turtle billboard signs (such as already exist in La Plaine) at nesting beaches known for poaching activity. Continuing (and expanding the readership for) the quasi-monthly *RoSTI Information Bulletin* is also recommended.

Sponsorship of Community Events- Sponsorship of village activities is a way to emphasise partnerships, support community development (beyond conservation issues), and encourage leadership. Sponsorship might involve a local musical band, Forestry or Fisheries extension program, Creole music festival, DiveFest activities, village football league, assisting a contestant for a queen show or quadrille festival, supporting a youth camp or church summer school. This type of participation shows the practical benefits

of conservation. One recommendation might be to sponsor a monthly workshop, each taking place in a different area; another might be to focus on outreach targeting tour guides, taxi drivers, hoteliers, dive shops, car rental agencies, eco-tourism promoters, etc.

Market Assessment- During 2003 a preliminary market assessment was undertaken in support of one of the main goals of RoSTI, which is to develop a viable 'Turtle Watching' program at the Rosalie Estate that might serve as a model for other communities on the island. It is a recommendation that a more in-depth study be conducted at some point, and that it incorporate data collected on the nesting beaches to evaluate whether the natural resources (sea turtles) are sufficient to support a sustainable venture.

Project Support/ Income generation- It is a recommendation that steps be taken to generate funding for sea turtle conservation at the local level, with an aim to provide sustainable income to the project in the future. Such steps might include unique product sales, including books, postcards and clothing; a RoSTI 'turtle stand' at Emerald Pool which, during the cruise-ship season, has 700 visitors daily and is only 20 minutes' drive from Rosalie; and/or an 'Adopt-a-Turtle Campaign' targeted at visiting tourists and advertised during public presentations.

National Regulatory Framework- Dominica remains one of the relatively few countries in the world that manages its sea turtle resource by means of minimum size limits. An open access sea turtle fishery is legal during all but 16 weeks each year, and operates with few constraints. The law bans capture of turtles smaller than 20 pounds (and turtles engaged in nesting) and prohibits the collection of sea turtle eggs. There is no system of national record-keeping pertaining to the harvest, and no estimates of sustainable yield. Nesting populations are small; there are no data on the status of foraging stocks.

Sea turtle life histories are characterized by high juvenile mortality, delayed sexual maturity, high fecundity, and extended longevity. Adult survivorship must be (and is) high under natural circumstances, and repeat breeding compensates for the loss of eggs on the beach and the loss of young juveniles to sharks and other predatory fishes at sea. Most Caribbean sea turtles begin breeding at 12-35 years of age, and tag records document that some individuals will continue breeding for two decades or more.

Small juvenile turtles are completing a period of rapid growth; thus, if turtles must be harvested, this size class is more easily replenished than the adult class. Green and Loggerhead turtles *larger than* 24 inches (60cm) in curved shell length are, on average, older than 10 years of age and well on their way to breeding a decade or so hence. [A length threshold, as opposed to a weight threshold, is preferred because length is more easily verified at the point of capture.] Turtles that survive their first decade of life quickly become vastly more important than younger individuals to the continued survival of the population.

In accordance with the animals' basic biology, we recommend that legislation be considered that not only protects nesting females and eggs, but enforces a closed season from 1 April to 30 November (inclusive) in order to protect the vulnerable mating and nesting adults offshore, and requires maximum, as opposed to minimum, size limits. We also recommend that a seasonal harvest be restricted to juvenile Green and Loggerhead turtles, as Hawksbills and Leatherbacks are classified by the IUCN Red List of Threatened Species as *Critically Endangered* (www.iucnredlist.org). As important is the fact that only actively breeding Leatherbacks are encountered, thereby eliminating any opportunity to take immatures of this species.

Regulations allowing any level of legal take should require a monitoring program to document the harvest, including trends in catch per unit effort.

Moving beyond the idea of a regulated harvest – aware of the demonstrated potential for income-earning ecotourism initiatives based at nesting beaches and recognizing the already critically low number of nesting females available to support profitable 'Turtle Watches' – Government might consider the timely usefulness of a moratorium on sea turtle harvest during a period of stock assessment and evaluation, using such a period of time to conduct a national census, estimate sustainable yields, and evaluate the desirability of non-consumptive use options.

Introduction

In April 2003, the Wider Caribbean Sea Turtle Conservation Network (WIDECAST) launched a new community-based project in the Commonwealth of Dominica. This project, entitled the "Rosalie Sea Turtle Initiative" (hereafter referred to as "RoSTI"), is the first comprehensive attempt to research and conserve endangered sea turtles on the island, and adds Dominica to the list of more than 30 other Caribbean states and territories with existing WIDECAST-affiliated sea turtle programmes.

WIDECAST embraces the largest regional network of sea turtle research and conservation projects in the world, and is comprised of scientists, natural resource managers, educators and other experts dedicated to the survival of sea turtles in the Caribbean Sea. This available pool of expertise provides a basis from which all Caribbean countries can actively participate in the conservation of endangered species at all levels, from fieldwork and the collection of data to the development of best practices and the dissemination of information directly relevant to management action.

Through its affiliation with the WIDECAST network, RoSTI, which was conceptualised to serve as a practical example of how the sustainable management of depleted sea turtle stocks can be accomplished at both community and national levels in Dominica, continues to benefit richly from the experience of others in the region. For example, data record forms and public outreach materials were based on materials in use in other Caribbean islands; project staff and partners had the opportunity to travel to neighbouring countries to learn from what others are doing; and members of the project, Forestry and Fisheries officers, and in some cases the Rosalie Estate development team participated in the 2004 and 2005 annual general meetings of WIDECAST.

RoSTI is but a first step in providing Dominicans with experience in developing their own research priorities, creating their own conservation successes, and looking to a future that includes healthy populations of sea turtles. The purpose of this Biannual Project Report is to summarise progress to date, including the objectives, methods and results from 2004 and 2005. With consistent and heartfelt support from Government, the business community, the communities of the South-East coast, and the citizenry of Dominica, the project has accomplished much. The information collected and the results obtained have set the stage for additional work in the coming years, and the development of an integrated and science-based agenda for sustainable turtle management in the country.

Study Site

The "Rosalie Sea Turtle Initiative" (RoSTI) is based in Rosalie Bay on the South Eastern side of Dominica, commonly referred to as "The Nature Isle" of the Caribbean. Dominica (754 km^2 in area) is situated in the Windward Islands, flanked by the French Departments of Martinique to the south and

Guadeloupe to the north. The island has a rugged, mountainous terrain reflecting its volcanic origins. The highest point, Morne Diablotins, reaches to 1,447 m. Dominica is forested and has many streams and rivers. The climate can be described as humid and tropical, with an average temperature of about 27°C and an average annual rainfall of 175 inches (most falling during the rainy season). Rainfall increases towards the central parts of the island, which receive approximately 400 inches of rainfall annually. Rock falls and landslides, particularly in the more mountainous regions, are common during the wet season. Dominica's location also places it in the hurricane belt; as a result, the island is particularly vulnerable to storms and hurricanes from June to November.

Dominica boasts a wide range of flora and fauna. According to Dominica's First National Report to the Conference of Parties to the Convention on Biological Diversity (Government of Dominica, 2002), the plant diversity includes approximately 155 families, 672 genera and 1226 species of vascular plants and several plant species which are recorded as endemic to the island; e.g. (*Sabinea carinalis*), locally referred to as Bwa Kwaib. Dominica's birds include 2 single-island endemics and 9 regional endemic species. Its 2 endemic parrots (the Imperial parrot or 'Sisserou', *Amazona imperialis*, and the Red-necked 'Jacquot', *Amazona arausiaca*) are both considered Threatened (cf. IUCN Red List). Eighteen species of wild terrestrial mammals, including 1 species of opossum and 1 species of feral pig, and 19 reptile species have been recorded in Dominica. Of these, the Ground Lizard (*Ameiva fuscata*), Tree Lizard (*Anolis oculatus*), a snake (*Typhlops dominicana*) and a tree frog (*Eleutherodactylus amplinympha*) are endemic.

Politically Dominica is a member of the Organisation of Eastern Caribbean States (OECS). It has traditionally been an agriculturally based economy, focusing particularly on bananas until very recently. Still dependant on agriculture, the island remains highly vulnerable to climatic conditions and international market and economic developments. Tighter standards and costs associated with the banana industry, coupled with a shift in Government focus away from agriculture into areas such as tourism, have had an impact. Despite Government policy, however, development of the tourism industry remains slow. This has been attributed to its relatively few beaches, rugged coastline, and absence of an international airport. As a result of these and other factors, overall economic growth has been sluggish in recent years.

Rosalie Bay- The project's specific geographic focus is Rosalie Bay, an area that embraces four distinct sandy beaches: Rosalie Beach (also referred to as Coffee Beach), La Plaine (also referred to as Bout Sable Beach) and two much smaller 'pocket beaches' referred to as B'avine Cyrique and Secret Beach (Bot-la-me). Due to the bay's location on the Atlantic, rather than the Caribbean, coast, these beaches are typical windward facing "high energy" beaches. Surrounding Rosalie Bay are four villages. The largest of these, Grand Fond (to the north) and La Plaine (to the south), flank the smaller twin villages of Morne Jaune and Riviere Cyrique. Each village is at least 20 minutes' walk to the closest of the 4 beaches. Only La Plaine Beach and Rosalie Beach can be accessed by vehicle; the smaller beaches, B'avine Cyrique in particular, can only be accessed on foot during daylight in good weather.

Rosalie Beach is one of the larger, more popular beaches in the area. Adjoining the Rosalie Estate, a former copra (coconut) plantation, it is the first beach in Rosalie Bay to be reached when approaching the Rosalie area from the north. The beach, like all others in the area, is a black sand beach. On its northern border flows the Rosalie River, one of the larger rivers in the area, and on its southern flank the beach abuts a high cliff face. Crossing the beach are two small streams.

Rosalie Beach, like others in the area, is very dynamic and its profile changes rapidly. Cycles of sand deposition and erosion expose large rocks, create a pebble beach or vary the length, width and/or depth of

the sandy substrate. This is mostly a function of the rough Atlantic Ocean, but the streams present on the beach play a large role as well, particularly during the wet season. Typically, as the sand disappears, the southern end of the beach becomes inaccessible during high tides, as the waves dash against the large rocks which have become exposed. To the north, towards the river, the beach is usually comprised of stones and rocks, in times of unusually high deposition there may be limited amounts of sand for short periods of time. On the opposite side of the Rosalie River is a small, well-defined bay having a stony beach. Offshore Rosalie Bay is a coral reef system which protects the beach from powerful ocean swells and may provide important foraging habitat for resident sea turtle populations.

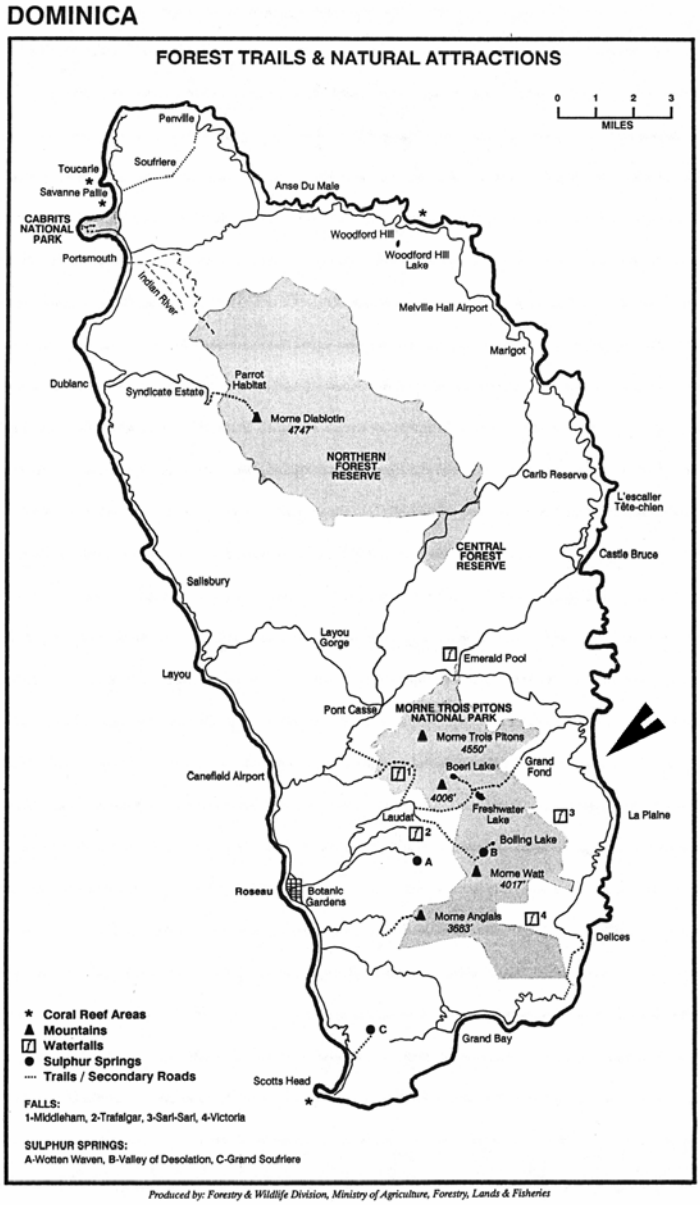

Figure 1. The Commonwealth of Dominica, indicating (by the arrow) the location of Rosalie Bay.

B'avine Cyrique is the next small pocket beach south of Rosalie Beach. It is a black sand beach at the bottom of a cliff with a small, high waterfall. It is closest to the La Crete area of Riviere Cyrique, and is accessed by single track and climbing down the cliff face using a tree for support. It is a very popular spot for line fishermen; however, even the fishermen avoid it when it is wet and at night. Secret Beach or "Bot-la-me" is also in the village of Riviere Cyrique. This beach is reached by passing through River Mahoe and following a single-track trail down the hillside to the beach. The actual beach is very small and has a tiny stream on one side.

La Plaine (Bout Sable) Beach is the other main beach in the area. The furthest south, it is closest to the village of La Plaine. It is accessible by road and is also crossed by two small streams. The first stream is near the access point, and south of the river's mouth is a usually stony beach that in periods of heavy deposition accumulates sand. It rounds off to form a small bay that marks the end of La Plaine beach. The beach north of the river mouth is long and narrow. This end of the beach is marked by a smaller but wider beach with a little stream bounded by a cliff. This stretch of beach is also very active; the depth of the sand varies enormously, sometimes eroding completely to create long sections of rocky beach. Typically at these times the waves lash against the cliff face, preventing access to the end of the beach. In addition, the cliff butting this beach is prone to some degree of landslides and rock falls during the wet season.

Traditionally the rivers and forests of the national landscape have been among the most important natural resources in Dominica's culture and psyche. Historically the coastal area of Rosalie (including the beaches) has been very important to the people in the surrounding villages. Years ago, even before the present settlements of Grand Fond, La Plaine, Morne Jaune and Riviere Cyrique existed, there was a single village in Rosalie; later the four present-day villages were formed. Most of the villagers still maintain a cultural link to Rosalie and it is a very popular area for picnics and get-togethers on Public Holidays. During the summer months, when a combination of no school and calm seas make the beach a popular spot, dozens of children and villagers, especially from Grand Fond, enjoy the area. As with B'avine Cyrique, Rosalie Beach is popular with line fishermen.

As a people very reliant upon, and with close ties to the land, Dominicans see harvesting their natural resources as their birthright. The fertile soil produces abundant crops, the rivers and streams crayfish, the forest manicou or opossum (*Didelphys marsupialis insularis*), agouti (*Dasyprocta leporinus*), and crapaud or mountain chicken (*Leptodactyllus fallax*), and the sea, fish and marine turtles. It is within this geographic, historical and cultural context that the RoSTI project was born and has flourished.

Project Objectives

RoSTI was planned as a three-year pilot project, Phase I (2003-2005) of which is now complete. To guide its development, several goals were set to ensure that the project stayed on course. These covered the four basic areas (Research, Education, Conservation, Community Consideration) described at the project's inception (see Franklin et al. 2004) as follows:

Research- to establish baseline information, and lay the foundation for obtaining the necessary scientific information for national management and conservation efforts directed toward sea turtles. The data will focus on the distribution, abundance, seasonality and species of sea turtles nesting along the South East coast of Dominica, and major threats to their survival. This information, combined with existing and

historical data, will contribute to the development of a 'Sea Turtle Recovery Action Plan for Dominica' and support ongoing discussions about the protection of critical sea turtle habitat.

Education- to inform adults and children of the complex biology of sea turtles, their role in local ecosystems, and the importance of managing threats to their survival with the aim of ensuring stable populations and sustainable use options for the future. The education component is envisioned to include initiatives such as workshops, public presentations, internships, fieldtrips and summer camp for children.

Conservation- to identify current threats and make recommendations to local community organisations, to Government, and to other stakeholders regarding mitigating options and alternatives. The project will emphasise the involvement of local communities in the design of conservation programs, and local hoteliers in implementing "turtle friendly" beach management protocols, such as finding alternatives to artificial lights shining on nesting beaches.

Community- to raise awareness of the biology and status of depleted sea turtle stocks as well as to encourage interest on the part of Dominicans to become involved in a locally run 'Turtle Watching' venture. The project will work with community leaders to identify ways in which sea turtle conservation can benefit the community, and meet community development needs. The project will recruit residents, including current poachers, to contribute information to the project, to patrol nesting beaches, to safeguard turtles and nests, and to share their knowledge with the area's residents, children and visitors.

Ultimately the goal is to have the project managed entirely by local staff, and include a profit-making eco-tourism venture administered from within the community. With all of this in mind, RoSTI Project Managers and community beach patrollers tasked, each year, with the following *inter alia*:

- Identify the sea turtle species that utilise the Rosalie Bay area,
- Evaluate the relative importance of Rosalie Bay habitats to sea turtles in Dominica,
- Design and implement a regular schedule of beach patrols in order to estimate nest abundance, distribution and seasonality, and in such a way as to encourage trend assessments,
- Design and implement a nest monitoring program sufficient to estimate annual reproductive success and major causes of nest mortality,
- Document and report incidents of adult mortality (e.g. poaching, stranding resulting from incidental capture and drowning offshore),
- Participate in public awareness campaigns designed to eliminate illegal sale of sea turtle products, such as polished shells and jewellery, in Dominica,
- Collaborate with law enforcement to develop a strategy to deal with illegal activity,
- Print and distribute locally and nationally, at least two public education/awareness items, such as a slide show, brochure, poster and/or leaflet,
- Visit a minimum of two schools each month of the term,
- Participate in at least two media events to promote the project and involvement by the community
- Give at least two print and /or radio interviews on RoSTI, local sea turtles, and current issues,
- Involve community members in research, public education, and habitat protection,
- Encourage community support for conservation efforts by sharing information about the biology and status of sea turtles in Dominica and worldwide, and by embracing community leaders in the development of specific conservation objectives, and
- Prepare recommendations to local stakeholders, including Government, for the ongoing management and conservation of the sea turtle resource.

Methodology

Field Research- To determine the sea turtle species using the beaches of Rosalie Bay, project staff established a schedule of foot patrols and used record-keeping forms designed in 2003 (see Appendix I) to document the distribution, abundance, and seasonality of sea turtle nesting and the fate of eggs laid during regular night patrols and early morning surveys.

The 2004 research season extended from 1 March to 30 October; similarly, the 2005 research season extended from 17 March to 30 September. Nocturnal patrols were conducted 5-7 nights per week on Rosalie and La Plaine beaches. The night-time presence of research personnel acted as a countermeasure and deterrent to repeated cases of attempted turtle poaching (illegal under Dominican law), as documented by RoSTI staff. While serving to immediately reduce the problem of poaching, the patrols also facilitated the tagging and measurement of nesting females. In order to conduct an accurate survey of nesting activity, each beach was patrolled hourly, meaning that no beach sector was left unattended for more than one hour (the average time required for nesting).

In both 2004 and 2005, night-time patrols lasted till dawn (typically, 8:00 PM to 5.30 AM), providing an excellent record of the night's nesting activity on both Rosalie and La Plaine beaches. When beaches could not be patrolled due to heavy rains or swells, patrols were conducted early the following morning. During these patrols, activities or factors present on the beach which might have affected nesting females or hatchlings were also noted. These included abiotic factors (e.g. beach erosion, pollution, beach litter/ debris) as well as man-induced factors (e.g. poaching, vehicle on beaches, sand mining, patterns of beach use, presence of domestic animals).

Figure 2. RoSTI beach patrollers Mr. Francis 'Vae' Lawrence and Mr. Dexter George documenting a typical Green sea turtle (Chelonia mydas) nest at Rosalie Beach. © R. Byrne/ marinecreatures.com

When a turtle crawl was encountered, RoSTI staff determined (or made an informed judgment) whether or not eggs had been laid. Eggs laid in high risk areas, such as too close to the surf, were carefully excavated within 12 hours of deposition and re-buried in a beach cavity dug to mimic the nest's original dimensions (depth, width), but placed higher on the beach platform. Training from WIDECAST's Director of Science was provided to all RoSTI staff for this and other field techniques. Best practices as described in Eckert et al. (1999) were followed at all times.

Record-keeping protocols for the field data were designed to ensure data accuracy, consistency, and the practicality of data organization, archival, and retrieval. The RoSTI data sheet (Appendix I) was used to record all sea turtle activity encountered during patrols, including nesting attempts, hatchings, and incidents of poaching. The reverse side featured a map drawn to aid in locating the nest site at a later date (such as at hatching, or to allow follow-up after a storm event).

Late in the season when it became evident that eggs were being lost even from relocation sites due to substantial beach erosion, project staff began to systematically monitor beach erosion. Data collection on beach erosion and seasonal changes in beach profiling remains incomplete, and improving our understanding of beach dynamics will be a priority for future years. Forestry officers have been collection this information since 1987, and these data are sure to be useful as well.

In support of conservation objectives, and to further encourage community participation, locally popular annual beach clean-ups were held in May and again in July in both 2004 and 2005. Activities were organized by visiting 'Goputney Kids' (www.goputney.com) from the US in partnership with local school children (Figure 3).

Figure 3. Community Beach Clean-Up at Rosalie Beach during DIVEFEST (June 2004). Beach clean-ups are an important part of sea turtle conservation and community pride! © R. Byrne/ marinecreatures.com

Results : 2004

Overview- The 2004 research season began on 1 March and ended on 30 October, during which time RoSTI staff documented a total of 72 sea turtle sightings within Rosalie Bay (Rosalie and La Plaine beaches), as well as 18 activities at other locations on the island. The total number of recorded sea turtle sightings was 90 (Table 1). The first recorded activity occurred on 2 March, the last on 22 October. Rosalie Beach was the favoured site for these sightings, with 41.1% of total sightings. La Plaine beach accounted for 38.9% of sightings, while 20.0% occurred in other locations. Three species of endangered sea turtles (Appendix II) nested on the beaches of Rosalie Bay: the Leatherback (*Dermochelys coriacea)*, Hawksbill (*Eretmochelys imbricata)* and Green *(Chelonia mydas)*, with the majority of sightings being of the Leatherback (Table 2).

Table 1: 2004 Sea Turtle Sightings by Beach in the Commonwealth of Dominica. A sighting is defined as the observation of an adult or juvenile turtle, a hatchling event, or a nest. Data recorded from "other" locations are recorded opportunistically and do not reflect an accurate total. Data from La Plaine and Rosalie beaches are considered to be complete for the survey period of 1 March to 31 October 2004.

Sightings by Beach		
Beach	**Sightings**	**Percentage**
La Plaine	35	38.9%
Rosalie	37	41.1%
Other	18	20.0%
TOTAL	**90**	**100%**

Table 2: 2004 Sea Turtle Sightings by Species at Rosalie Bay (Rosalie and La Plaine beaches) in the Commonwealth of Dominica.

Ratio of Species Activities		
Species	**Sightings**	**Percentage**
Leatherback	46	63.9%
Hawksbill	13	18.0%
Green	13	18.0%
TOTAL	**72**	**100.0%**

Egg-laying- There were 11 confirmed nests on Rosalie and La Plaine beaches in 2004. A nest was documented as "confirmed" only when eggs were visually or physically verified in the nest chamber. Due to the immense size of Leatherback nests and the extent of their disguising, it was sometimes impossible to confirm eggs. As a result, 6 sightings could only be labelled as "suspected nests". Together these 17 confirmed and suspected nests comprised 28.3% of all recorded results, with false crawls (unsuccessful nesting attempts) occurring at a frequency of 71.7% (Table 3). All nesting results occurred at roughly the same relative frequency at both Rosalie and La Plaine beaches, with false crawls occurring more often at La Plaine (Table 4).

Table 3: 2004 Results of Sea Turtle Nesting Activities at Rosalie Bay (Rosalie and La Plaine), Commonwealth of Dominica.

Results of Turtle Activities		
Result	**Cases**	**Percentage**
Confirmed Nest	11	18.3%
Suspected Nest	06	10.0%
False Crawls	43	71.7%
TOTAL	**60**	**100.0%**

Table 4: 2004 Nesting Results by Location (Beach) at Rosalie Bay, Commonwealth of Dominica.

Nesting Results by Beach				
	Rosalie		**La Plaine**	
Nesting Result	Amount	Percentage	Amount	Percentage
Confirmed Nests	06	22.2%	05	15.2%
Suspected Nests	03	11.1%	03	9.1%
False Crawls	18	66.7%	25	75.7%
TOTAL	**27**	**100%**	**33**	**100%**

Tagging- RoSTI staff tagged 18 Leatherback, 6 Hawksbill and 2 Green turtles for a total of 26 turtles tagged (Table 5) in 2004. Tagging was only undertaken on Rosalie and La Plaine beaches during regular patrols and by trained RoSTI patrol staff, and only 36.1% of adult and juvenile turtle sightings resulted in the application of identification tags. Of the turtles tagged, 5 (19.2%) were documented returning to nest again. All turtles were tagged as they left the beach, and not before or during a nesting event or false crawl so as not to frighten the animal or change its course of action. Tagging occurred mostly in April and May, corresponding to the higher number of sightings in these months (Chart 1).

Table 5: Tagging Dates at Rosalie Bay (Rosalie and La Plaine), during routine beach patrols from 1 March to 30 October 2004.

Date	**Species**		
	Leatherback	**Hawksbill**	**Green**
3/08/04		2	
3/10/04			1
3/20/04		1	
4/08/04			1
4/12/04	1		
4/20/04	1		
4/21/04	2		
4/22/04	1		

4/25/04	2		
4/27/04	1		
5/01/04	1		
5/03/04	4		
5/04/04	1		
5/08/04		1	
5/12/04	1		
5/15/04	1		
6/05/04	1		
6/15/04	1		
7/28/04		1	
9/23/04		1	
TOTAL	**18**	**6**	**2**

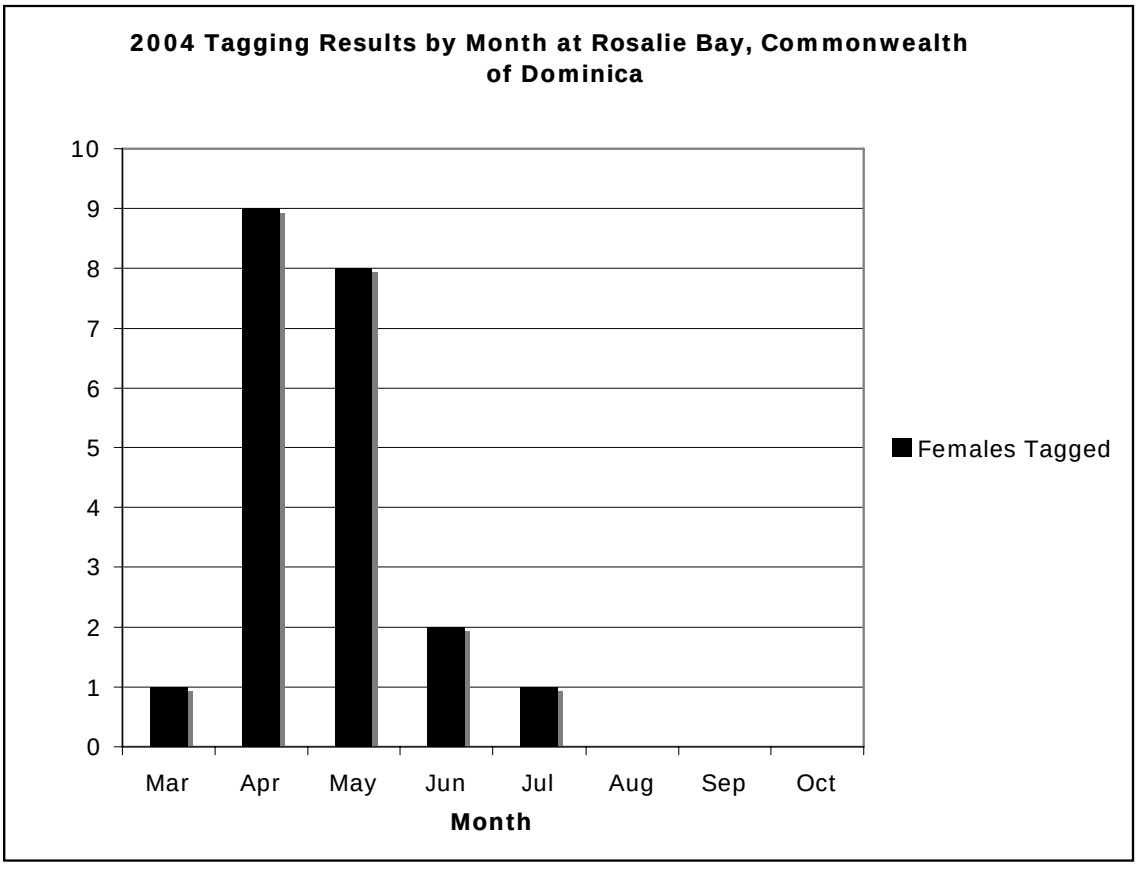

Chart 1: Tagging Results by Month at Rosalie Bay, Commonwealth of Dominica, showing the number of adult females tagged.

Measurements- Leatherbacks*:* In 2003, the average curved carapace length (CCL) for 7 nesting Leatherbacks measured was 152.5cm (range: 137-165cm); while the average curved carapace width (CCW) for the same turtles was 124.5cm (range: 112-127cm). Similarly, in 2004, the average CCL was 149.8cm (range: 138-159cm) and the average CCW was 111.5 cm (range: 105-123cm) for 20 nesting Leatherbacks measured. However, because there were no repeated measurements for any individual turtle, the precision of these measurements could not be calculated. Hawksbills: In the case of Hawksbills, 4 measured individuals in 2003 showed an average CCL of 90.7cm (range: 88-95cm) and an average CCW of 82.7cm (range: 81-82cm). In 2004, 3 nesting females showed an average CCL of 94.3cm (range: 92-97cm) and average CCW of 81.2cm (range: 77-84.5cm). Greens: In 2003, 2 green turtles were measured, with an average CCL of 108cm and CCW of 103cm. In 2004, 3 measurements on adult nesting females showed an average CCL of 108.5cm (range: 107.5-109cm) and average CCW of 103.7cm (range: 101-105cm).

Seasonality- Data taken from 2003 and 2004 reveal a trend in seasonal nesting distribution at Rosalie Bay (Rosalie and La Plaine beaches) for Leatherbacks. These turtles nested mainly during the months of April, May and June, but there was little predictable seasonality associated with Green or Hawksbill turtles due to low-density nesting (Chart 2). As data accumulate for further years, more precise information nesting seasonality by species is likely to accrue.

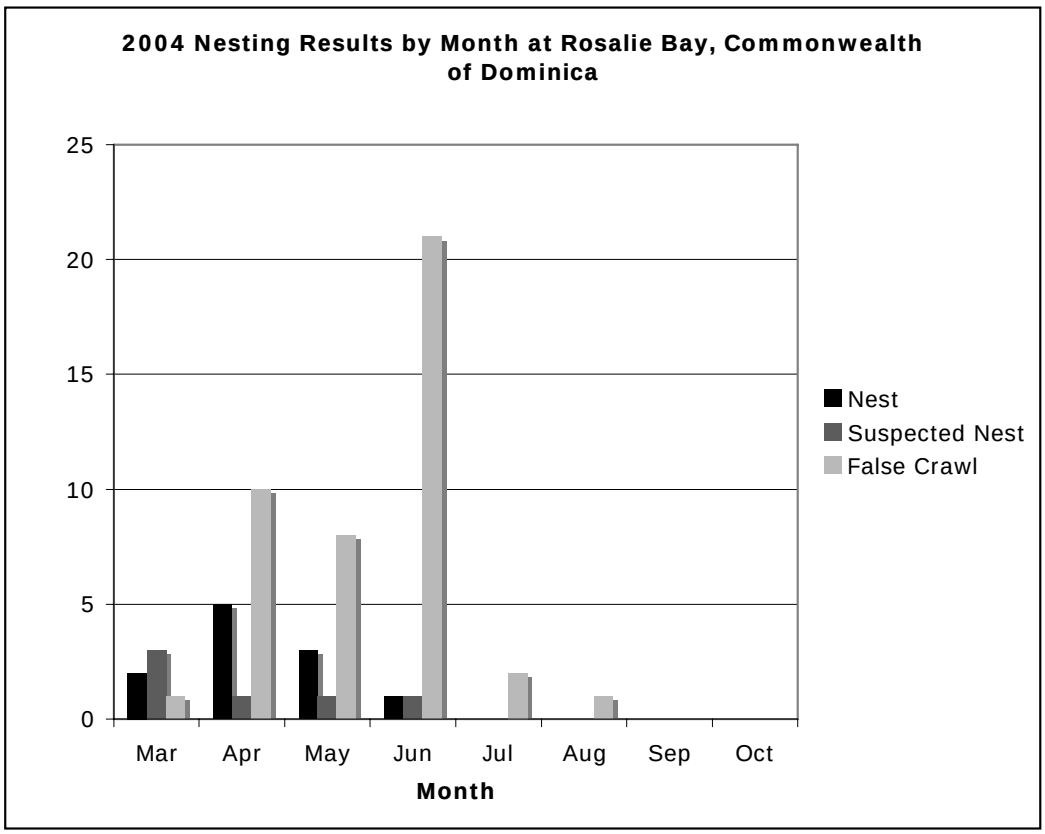

Chart 2: Nesting Results by Month at Rosalie Bay (Rosalie and La Plaine Beaches) for all species.

Details by Species- As noted in Table 1, Rosalie Beach had a total of 37 (41.1%) documented sightings, in comparison to La Plaine Beach, with 35 (38.9%) sightings. Despite the close proximity of the two survey beaches, the pattern of nesting differed between them (Table 6). For example, 25.7% of the nesting at La Plaine Beach was by Hawksbill turtles, almost twice the frequency evident on Rosalie Beach. Conversely, la Plaine received significantly fewer Leatherback nests than did Rosalie (Table 7).

Table 6: 2004 Documented Sea Turtle Species Sightings by Beach at Rosalie Bay, Commonwealth of Dominica.

Species Sightings by Beach				
	Rosalie		**La Plaine**	
Species	Sightings	Percentage	Sightings	Percentage
Leatherback	30	81.1%	16	45.7%
Hawksbill	04	10.8%	09	25.7%
Green	03	8.1%	10	28.6%
TOTAL	**37**	**100%**	**35**	**100%**

Table 7: 2004 Nesting Results by Species at Rosalie Bay, Commonwealth of Dominica.

Nesting Results by Species						
	Leatherback		**Hawksbill**		**Green**	
Nesting Result	Amount	Percent	Amount	Percent	Amount	Percent
Confirmed Nests	06	15.8%	02	18.2%	03	27.3%
Suspected Nests	03	7.9%	00	0.00%	03	27.3%
False Crawls	29	76.3%	09	81.8%	05	24.4%
TOTAL	**38**	**100%**	**11**	**100%**	**11**	**100%**

Details by Month- With the exception of April, La Plaine clearly attracted more nesting during 2004 than did Rosalie Beach. As has been the case in year's past (see Franklin et al. 2004), the peak season for nesting (all species combined) is April, May and June, with a secondary peak in August and September (Chart 3). On the whole, Leatherback and Green turtles nest earlier in the year than do Hawksbills, but it is also apparent that Hawksbills may be encountered at low densities throughout the year (Chart 4).

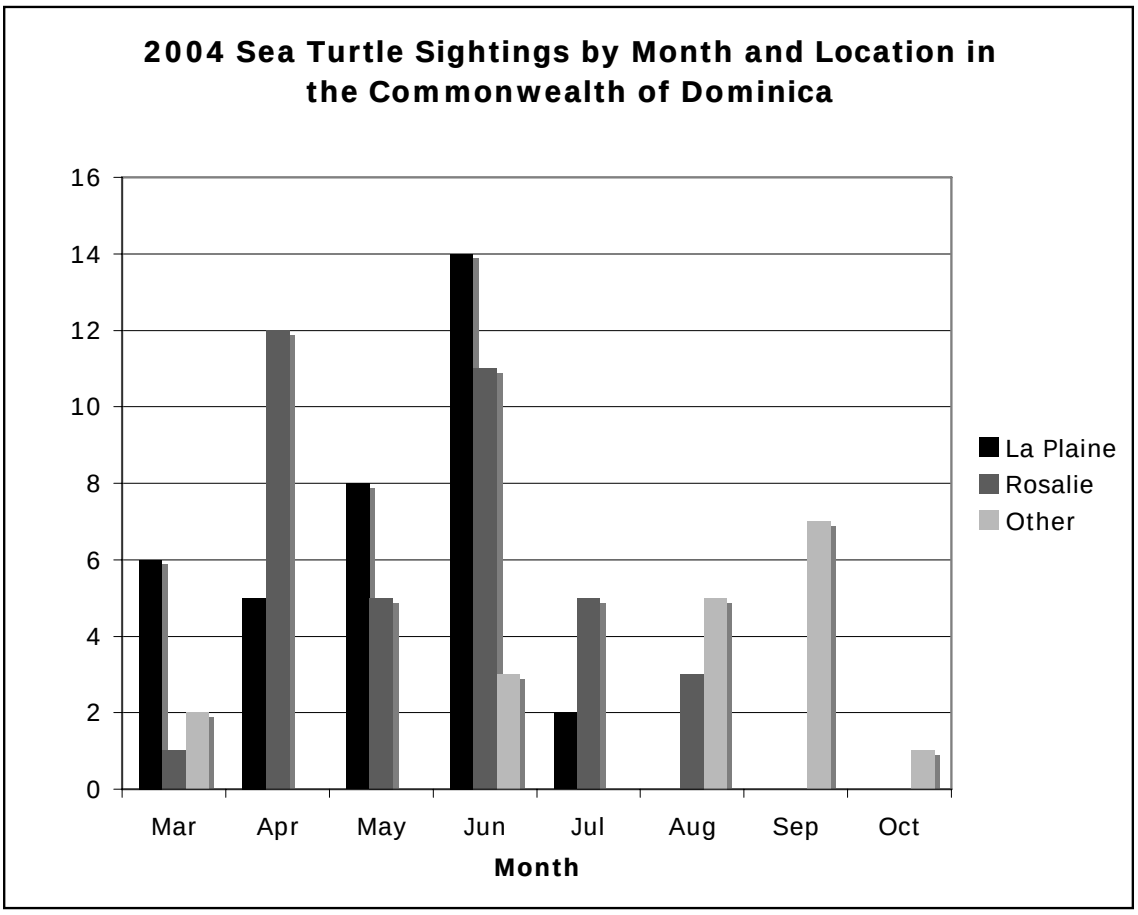

Chart 3: 2004 Sea Turtle Sightings by Month and Location in the Commonwealth of Dominica.

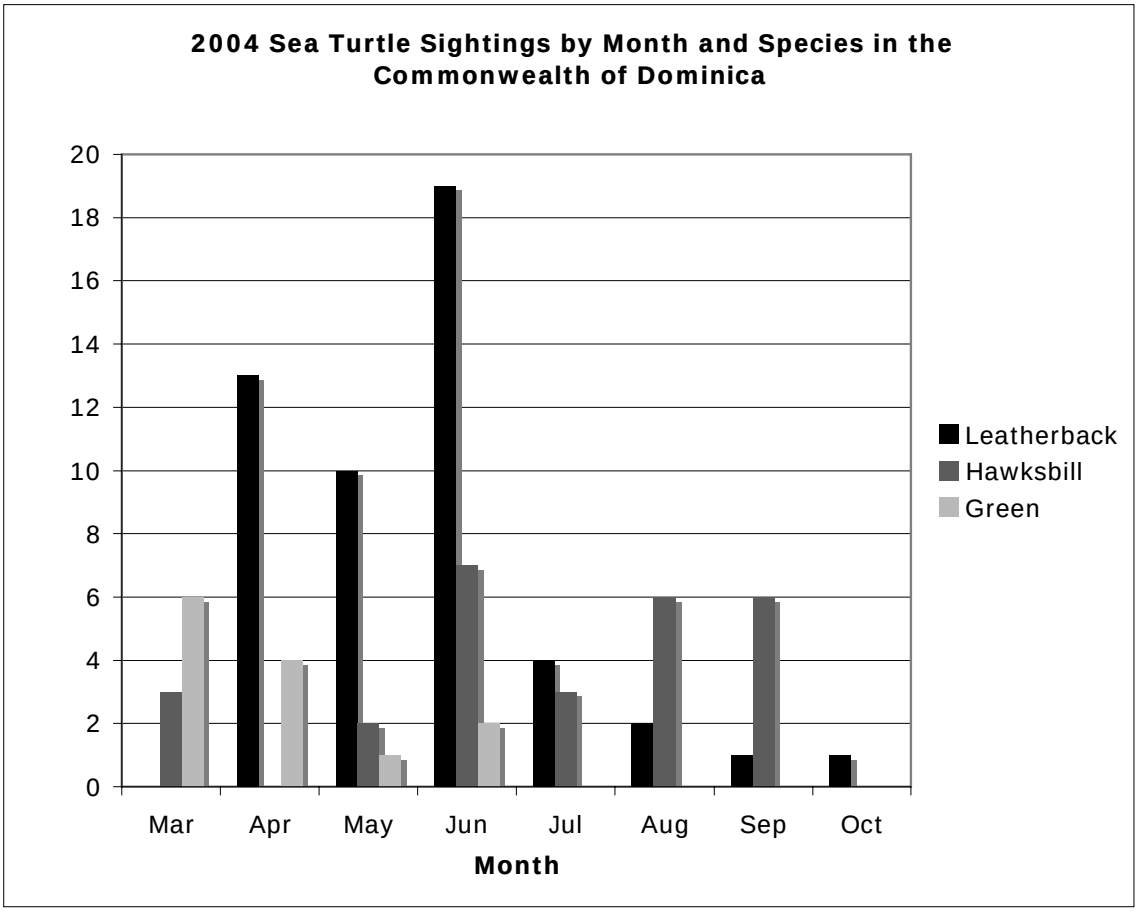

Chart 4: 2004 Sea Turtle Sightings by Month and Species in the Commonwealth of Dominica.

Nest Hatching Success- 386 hatchlings were successfully released to the sea at Rosalie Bay in 2004, including 215 Hawksbill, 53 Green, and 118 Leatherback hatchlings. All around the island, nests were reported and assisted by local community members. The *Sea Turtle Hotline* had many reports, particularly in Thibaud, on the north side of Dominica, where community members, forestry officers and RoSTI staff helped release 219 Hawksbill hatchlings. For 2004, a total of 605 hatchlings of all species (all locations) were immediately released back to sea.

Post-hatching, each nest was exhumed and its contents categorized to determine hatch success (the number of live hatchling emerging from the nest), development failure (e.g. suspended embryonic development and death due to bacterial infections, nest flooding, or other factors), genetic abnormalities (e.g. twinning and albinism) the proportion of undeveloped eggs and evidence of nest poaching and predation.

The most important threats to hatchling success were poaching of eggs from the nest and erosion from the sea occurring days, weeks or months after egg-laying.

Poaching and Injury- In addition to one Green turtle killed at La Plaine and documented by RoSTI staff, reports of 10 additional Leatherback killings were made from community members. Two of these reports were from La Plaine and the remaining 8 from other beaches on the northeast coast. While RoSTI did not visually confirm these killings, each report was received from a concerned community member via the national *Sea Turtle Hotline* or a personal meeting with a RoSTI staff member. These accounts provide only a minimum estimate of the number of turtles killed, as no systematic national survey or reporting system is in place to fully document these illegal killings.

The Laws of Dominica (Forestry and Wildlife Act, Chapter 60:02, Section 21, Ninth Schedule) prohibit the collection of eggs or the disturbance "of any turtle nest" and prohibit any "attempt to take any turtle laying eggs or on the shore engaged in nesting activities" at all times of the year. Furthermore, the law prohibits the killing of *any* sea turtle during an annual closed season from 1 June and 30 September (Appendix III).

Poaching was evident around the island, in some areas more than others, but as a result of the RoSTI project poaching was remarkably reduced within the study site (i.e. Rosalie Bay). In addition to the documented kills at La Plaine, calls to the *Sea Turtle Hotline* and verbal reports to RoSTI staff indicate that extensive poaching occurred during the research season in the areas of Woodford Hill, Calibishe, Anse de Mai and North Eastern Dominica, and that at least 8 Leatherbacks had been poached during the nesting season.

Prior to RoSTI's commitment to maintaining a presence on the nesting beaches, poaching on La Plaine, in particular, was very effective and organized. Many turtles were killed on their first nesting attempt of the season from this location. In most cases they were killed having just emerged from the water, meaning that no eggs were laid.

Such continued killing is surely a death sentence for this small, remnant nesting population. Remembering that hatchlings return to the geographical area or island of their birth when the time comes to lay their own eggs as adults, it is clear that Dominica will lose its nesting populations if a sufficient number of "Dominican" hatchlings are not hatched and released from local beaches.

The efforts of RoSTI staff to collaborate with law enforcement develop a strategy to deal with illegal activity intensified during peak Leatherback nesting season, when the threat of poaching activity was most severe. Moreover, much was accomplished by public education. RoSTI staff received countless calls from citizens concerned about poaching, reporting illegal incidents, and expressing their commitment not to eat turtle eggs or meat in the future. These changes of attitude were not for the turtles' sake, but for the nation's sake.

It is noteworthy that some nesting female sea turtles, particularly Leatherbacks, were seen with fishery scars and markings from fishing nets, and on two circumstances shark bites from what RoSTI staff surmised were Tiger sharks *(Galeocerdo cuvier*). In all cases the injuries were fresh injuries.

Results : 2005

Overview- The 2005 research season began on 17 March and ended on 30 September. During this time, RoSTI staff documented a total of 91 sea turtle sightings on La Plaine, Rosalie and Londonderry beaches, as well as 21 activities at other beaches around the island, for a total of 112 (Table 1). The first recorded activity was on 4 April, the last was on 26 August 2005. Rosalie Beach was the most favoured site for these activities, with 45 (40.2%) sightings. La Plaine and Londonderry accounted for 34 (30.4%) and 12 (10.7%) of the sightings, respectively, while the remaining 21 (18.7%) sightings were documented on other beaches outside the study area. Three species of endangered sea turtles (Appendix II) nested on the beaches of Rosalie Bay: the Leatherback (*Dermochelys coriacea)*, Hawksbill (*Eretmochelys imbricata)* and Green (*Chelonia mydas)*, with the majority of sightings being of the Leatherback (Table 2).

Table 1: 2005 Sea Turtle Sightings by Beach in the Commonwealth of Dominica. A sighting is defined as the observation of an adult or juvenile turtle, a hatchling event, or a nest. Data recorded from "other" locations was recorded opportunistically, and does not reflect an accurate total. Data from La Plaine, Rosalie and Londonderry beaches is considered to be complete for the survey period of 17 March to 30 September 2005.

Sightings by Beach		
Beach	**Sightings**	**Percentage**
La Plaine	34	30.4%
Rosalie	45	40.2%
Londonderry	12	10.7%
Other	21	18.7%
TOTAL	**112**	**100%**

Table 2: 2005 Sea Turtle Sightings by Species at Rosalie, La Plaine and Londonderry Beaches, Commonwealth of Dominica

Ratio of Species Sightings		
Species	**Sightings**	**Percentage**
Leatherback	83	91.2%
Hawksbill	05	5.5%
Green	03	3.3%
TOTAL	**91**	**100%**

Egg-laying- There were 20 confirmed nests on the beaches of La Plaine, Rosalie and Londonderry in 2005. A nest was documented as "confirmed" only when eggs were visually or physically verified in the nest chamber. Due to the immense size of Leatherback nests and the extent of their disguising, it was sometimes impossible to confirm eggs. As a result, 19 sightings could only be labelled as "suspected nests". Together, these 39 confirmed and suspected nests comprised 47% of all results with false crawls (unsuccessful nesting attempts) occurring at a frequency of 53% (Table 3). Nesting result patterns were similar between Rosalie and La Plaine beaches with Londonderry activities resulting mostly in suspected nests (Table 4).

Table 3: 2005 Results of Sea Turtle Nesting Activities at Rosalie, La Plaine and Londonderry Beaches, Commonwealth of Dominica.

Result of Turtle Activities		
Result	**# Cases**	**Percentage**
Confirmed Nest	20	24.1%
Suspected Nest	19	22.9%
False Crawls	44	53.0%
TOTAL	**83**	**100%**

Table 4: 2005 Sea Turtle Nesting Results at Rosalie, La Plaine and Londonderry Beaches, Commonwealth of Dominica. N=Confirmed Nest, SN=Suspected Nest, FC=False Crawl

Nesting Results by Beach						
	Rosalie		**La Plaine**		**Londonderry**	
Result	**Amount**	**Percentage**	**Amount**	**Percentage**	**Amount**	**Percentage**
N	11	30.0%	09	27.3%	00	0%
SN	04	10.5%	04	12.1%	11	91.7%
FC	23	60.5%	20	60.6%	01	8.3%
TOTAL	**38**	**100%**	**33**	**100%**	**12**	**100%**

Tagging- RoSTI staff tagged 12 Leatherback, 1 Hawksbill and 1 Green turtle for a total of 14 turtles tagged (Table 5). Tagging was only undertaken on La Plaine, Rosalie and Londonderry beaches during regular patrols and by trained RoSTI patrol staff; and only 13.2% of adult turtle sightings resulted in the application of identification tags. Of the turtles tagged, 7 of them were documented returning to nest again. All turtles were tagged as they left the beach, and not before or during a nesting event or false crawl so as not to frighten the animal or change its course of action. Tagging was undertaken mostly in the month of May, corresponding with the higher amount of activities recorded in that month (Chart 1).

Table 5: 2005 Tagging Dates at Rosalie, La Plaine and Londonderry Beaches, Commonwealth of Dominica, during routine beach patrols from 17 March to 30 September.

Date	Species		
	Leatherback	**Hawksbill**	**Green**
4/11/05	1		
4/26/05	1		
5/1/05	1		
5/3/05	2		
5/4/05	1		
5/5/05	1		
5/6/05	1		
5/7/05	1		
5/10/05	1		
5/12/05	1		
5/19/05	1		
5/27/05		1	
8/26/05			1
TOTAL	**12**	**1**	**1**

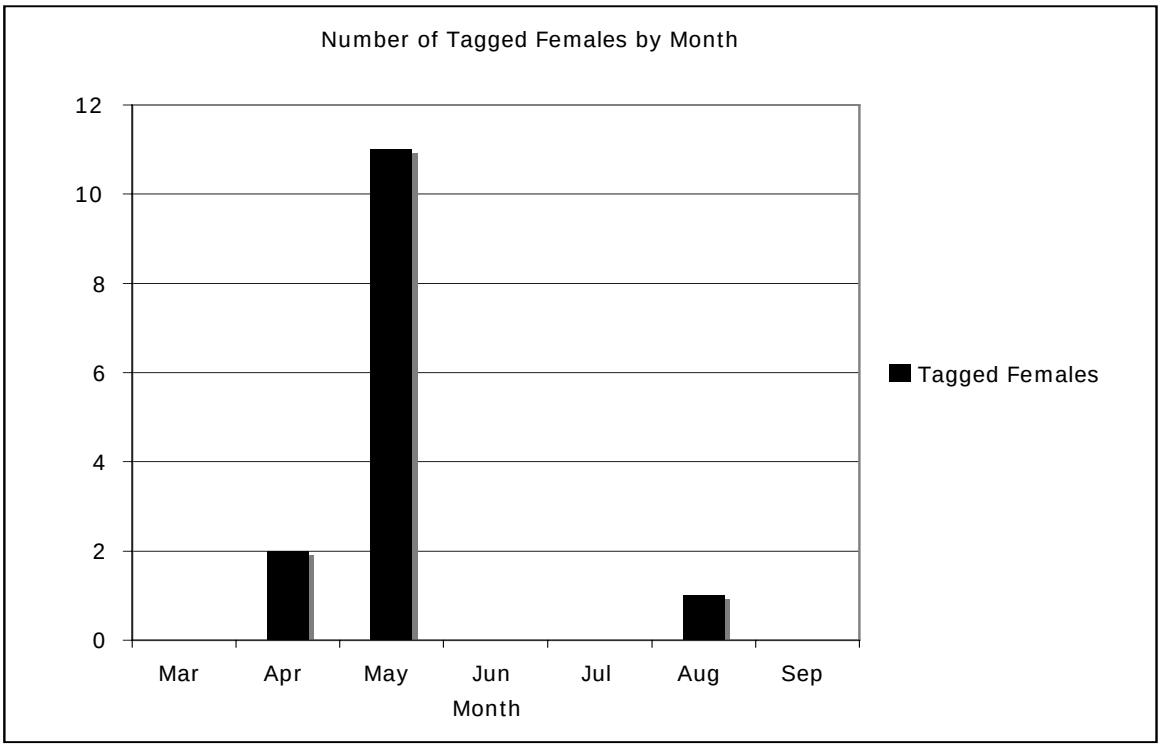

Chart 1: 2005 Tagged Female Sea Turtles (all species) at La Plaine, Rosalie and Londonderry Beaches, Commonwealth of Dominica.

Tag loss- In 2005 one tag was lost from a nesting leatherback within 5 weeks of it being applied. It is not known whether it fell out or was ripped out. No other incidents of tag loss were recorded, before or since.

Measurements- Leatherbacks: In 2005 the average CCL was 155cm (range: 141-170cm), with an average CCW of 118cm (range: 109-139cm). Measurements were taken to the nearest centimetre, and all subjects were nesting females. Hawksbills: In 2005, tagged adult female hawksbills had an average CCL of 87cm (range: 86-89cm) and CCW of 72cm. No individuals were measured repeatedly; therefore, accuracy cannot be known. Greens: In 2005, 1 adult female was measured at 103cm CCL and 88cm CCW.

Seasonality- A seasonal trend in Leatherback nesting, revealed in 2003 and 2004 data is also reflected in 2005. Leatherback turtles prefer to nest in April, May and June (Chart 2); for the Green and Hawksbill turtles, however, there is little predictable seasonality due, presumably, to low-density nesting.

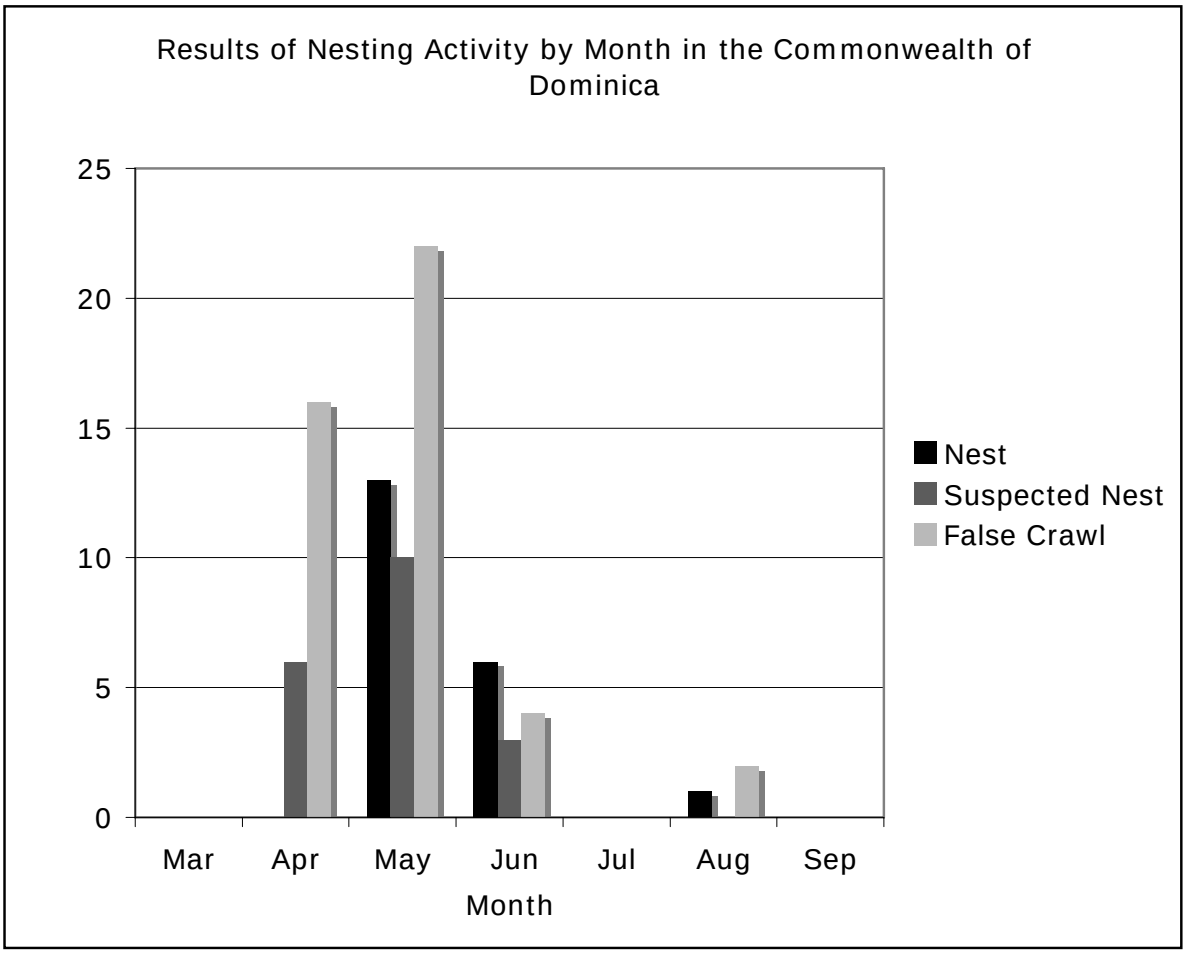

Chart 2: Nesting Results by Month at Rosalie Bay (Rosalie and La Plaine Beaches) for all species.

Details by Species- Rosalie Beach had a total of 45 sightings, while La Plaine and Londonderry beaches had 34 and 12 sightings, respectively (Table 1). Leatherback turtles were by far the dominant species at each beach. Unlike 2004, Green and Hawksbill turtles were mostly observed at Rosalie beach, as opposed to at La Plaine (Table 6).

Very little can be interpreted from the nesting results by species, as the number of Green and Hawksbill turtles observed was so low. It would appear, however, that the incidence of false crawls was relatively higher among these two species in 2005 than among Leatherbacks (Table 7).

Table 6: 2005 Sea Turtle Sightings by Species at Rosalie, La Plaine and Londonderry Beaches, Commonwealth of Dominica.

Sightings by Beach						
	Rosalie		La Plaine		Londonderry	
Species	**Sightings**	**Percentage**	**Sightings**	**Percentage**	**Sightings**	**Percentage**
LB	38	84.4%	34	100%	11	91.7%
HB	04	8.9%	00	0%	01	8.3%
G	03	6.7%	00	0%	00	0%
TOTAL	**45**	**100%**	**34**	**100%**	**12**	**100%**

Table 7: 2005 Sea Turtle Nesting Results by Species at Rosalie, La Plaine and Londonderry Beaches, Commonwealth of Dominica. N=Confirmed Nest, SN=Suspected Nest, FC=False Crawl.

Nesting Results by Species						
	Leatherback		Hawksbill		Green	
Result	**Amount**	**Percentage**	**Amount**	**Percentage**	**Amount**	**Percentage**
N	18	24.0%	01	20.0%	01	33.3%
SN	19	25.3%	00	0%	00	0%
FC	38	50.7%	04	80.0%	02	66.7%
TOTAL	**75**	**100%**	**05**	**100%**	**03**	**100%**

Details by Month- As in years past, the peak months for nesting were April, May and June with a secondary peak in August for all species. Both Rosalie and La Plaine beaches had similar sighting volumes, with Londonderry and other beaches on the island having lower volumes (Chart 3). Leatherback and Hawksbill turtles nested earlier in the season and, unlike in 2004, Green turtles were not seen until later in the season (Chart 4).

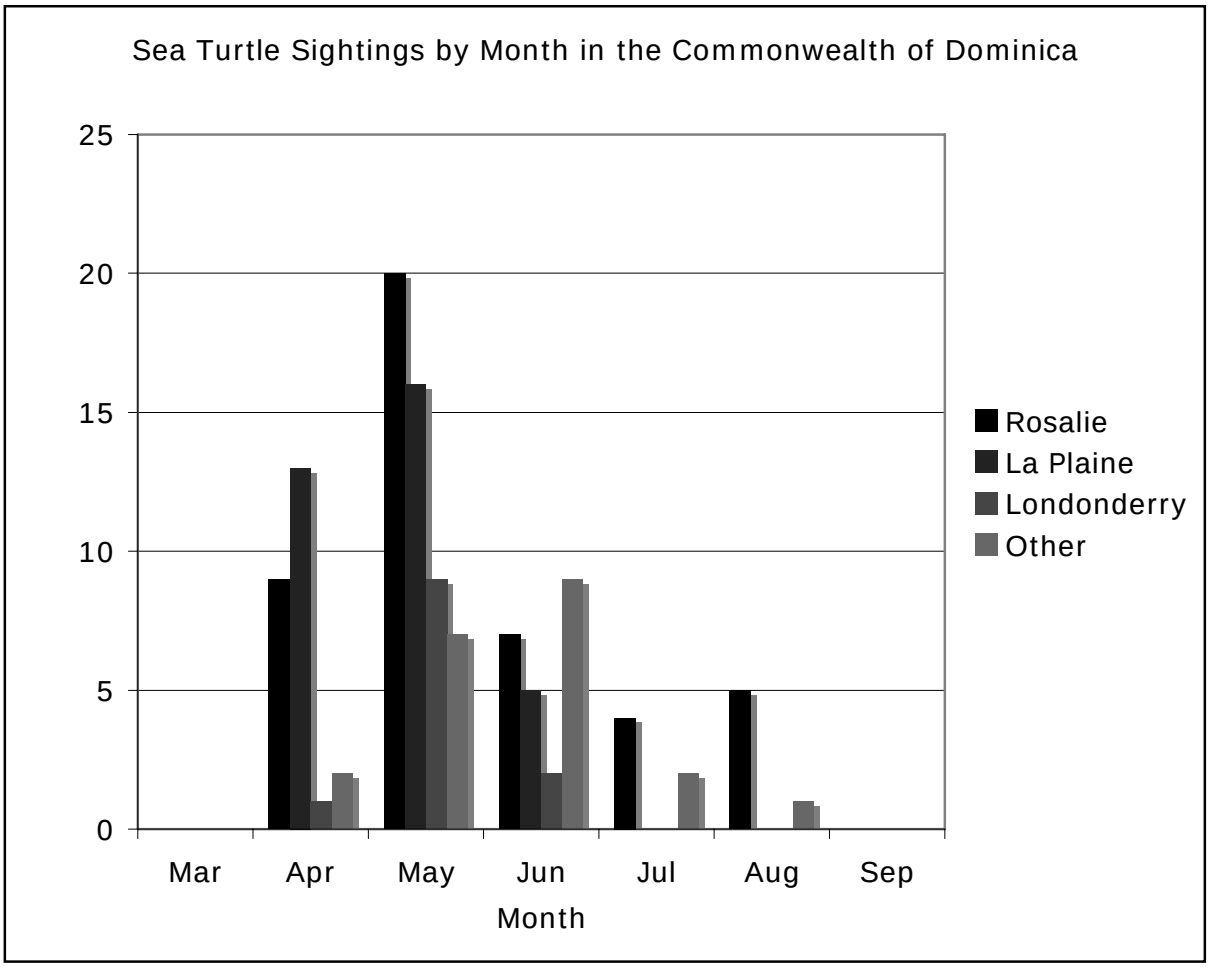

Chart 3: 2005 Sea Turtle Sightings by Month at all locations in the Commonwealth of Dominica

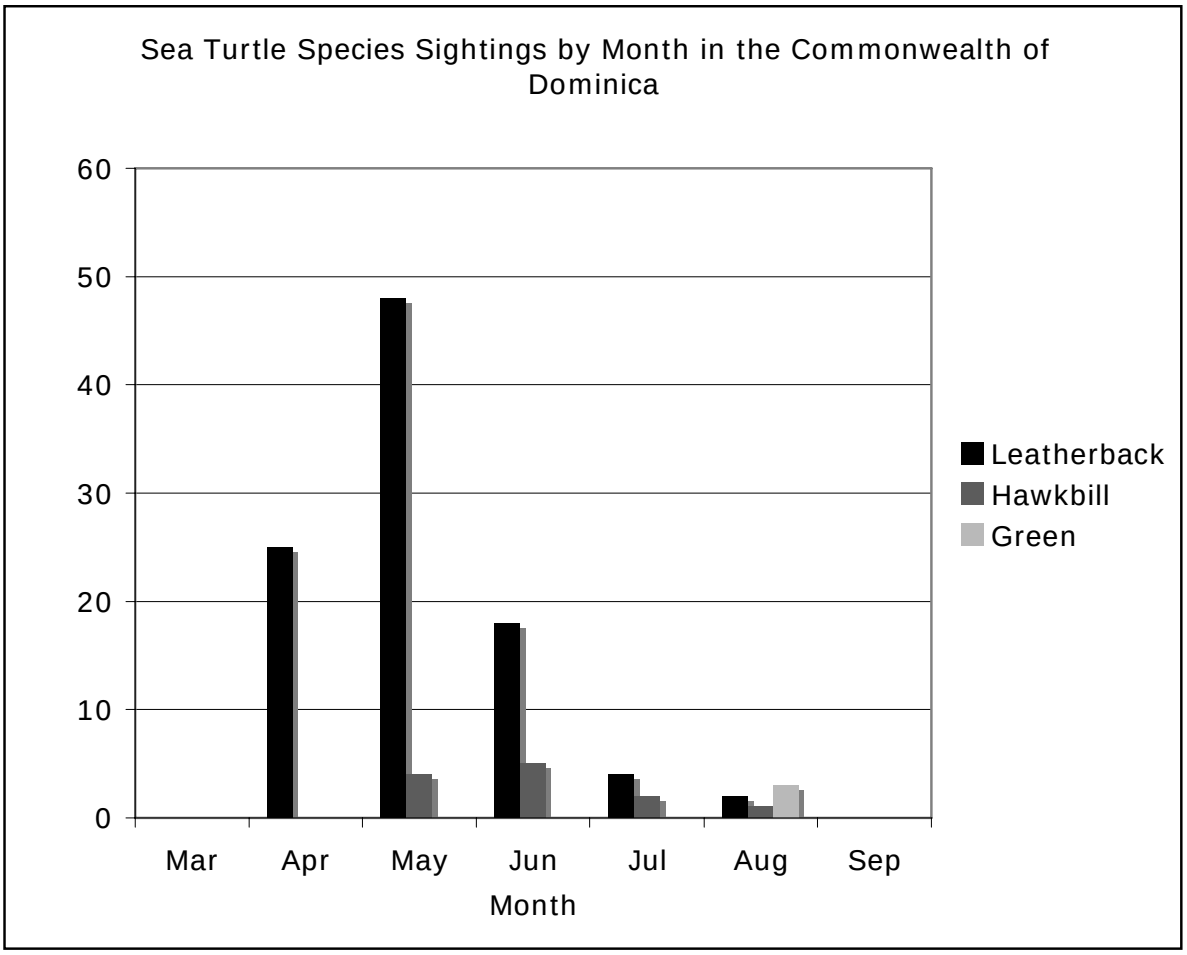

Chart 4: Sea Turtle Species Sightings by Month at all Locations in the Commonwealth of Dominica.

Nest Hatching Success- 628 hatchlings were successfully released back to sea at Rosalie Bay (Rosalie and La Plaine beaches) in 2005, including 217 Hawksbills, 133 Greens, and 278 Leatherbacks. All around the island, nests were reported and watched by local community members. The *Sea Turtle Hotline* had many reports, particularly from Donkey beach and from the West coast as a whole. Community members, Forestry officers and RoSTI staff all helped release hatchlings, and all species were released to sea.

Eight nests in the first hatchery (all leatherback) could not be excavated as beach vines surrounded the first number of nests, penetrating them with root-masses. It is not known how many eggs these roots killed, but numerous hatchlings were freed from this entrapment within successful nests. Three nests (one each of leatherback, hawksbill and green turtles) were placed in a second hatchery area, and these fared much better, partially due to early removal of roots.

Post-hatching, each nest was exhumed and its contents categorized to determine hatch success (the number of live hatchlings emerging from the nest, suspended embryonic development due to bacterial infections nest flooding, or other factors), genetic abnormalities (e.g. twinning, albinism), the proportion of undeveloped eggs and evidence of nest predation, etc.

The most significant threats to hatch success were the poaching of eggs from the nest and erosion from the sea occurring days, weeks or months after egg-laying.

Poaching and Injury- Anecdotal reports suggest that approximately 12 leatherbacks were killed on Dominica in 2005. While RoSTI staff did not visually confirm these reports, they were received via calls to the national *Sea Turtle Hotline* from reliable community members and through personal meetings.

Table 8: Poaching Events During the 2003-2005 Sea Turtle Nesting Seasons in the Commonwealth of Dominica.*

Species	**2003**	**2004**	**2005**
Leatherbacks	3	2	1
Hawksbills	0	0	1
Green	0	1	2
TOTAL	**3**	**3**	**4**

*These poaching events have not been included in the data for the preceding tables and charts.

The Laws of Dominica (Forestry and Wildlife Act, Chapter 60:02, Section 21, Ninth Schedule) prohibit the collection of eggs or the disturbance "of any turtle nest" and prohibit any "attempt to take any turtle laying eggs or on the shore engaged in nesting activities" at all times of the year. Furthermore, the law prohibits the killing of *any* sea turtle during an annual closed season from 1 June and 30 September (Appendix III).

Poaching was evident around the island, in some areas more than others, but as a result of the RoSTI project, poaching was remarkably reduced within the study site (Rosalie Bay).

Prior to RoSTI's commitment to maintaining a presence on the nesting beaches in order to collect science-based management data, poaching on La Plaine (in particular) was very effective and organized, so that many turtles were killed on their first nesting attempt of the season. In most cases they were killed just having emerged from the water, meaning that no eggs were laid.

Such continued killing is surely a death sentence for the very small local nesting population. Remembering that hatchlings return to the geographical area or island of their birth when the time comes to lay their own eggs as adults, it's clear that Dominica will lose its nesting populations if a sufficient number of "Dominican" hatchlings are not born from local beaches.

RoSTI staff received countless calls from citizens concerned about the poaching, willing to report illegal incidents, and expressing their commitment not to eat turtle eggs or meat in the future. These changes of attitude were not for the turtles' sake, but for the nation's sake.

Community Education and Outreach

Issues dealing with the community and the local environment were present at every level of operations. As such, much of the progress in community issues was intertwined with other aspects of the project, and has to some extent been addressed in previous sections. This is especially true in terms of education and community development, where, for example, much was accomplished by the hiring of community members including active (now former) poachers as beach patrollers, data collectors, and "presenters" to guests and children on the beach. The project hired members from several communities – including Mr. Julius Darroux (La Plaine village council leader), Brothers Mr. Osmond John and Mr. Jim Cadette (Morne Jaurne), and Mr. Francis 'Vae' Lawrence and Mr. Dexter George (Riverie Cyrique) – in a successful attempt to ensure equity and diversity in hiring and its associated benefits.

We recommend that the project promote continuity by retaining the best of these staff members, and that whenever possible hiring occur in communities where jobs are most needed. An important advantage of hiring from multiple communities is that residents more readily approach the local patrollers to learn about the project. Much of the information about the project and its objectives was spread in this manner, and many educational materials were shared!

Members of surrounding communities were routinely invited and encouraged to participate in 'Turtle Watching'. All participated in the learning experience, and the community beach patrollers, even early in the season, had great pride in their role as guides and interpreters. This was an especially unique evening for visiting members of the community, whom until the point of their first encounter had only seen poached and bloodied Leatherbacks in the back of a pick-up truck.

With regard to members of the community who were known to engage in the illegal killing of turtles and/or eggs from Rosalie and La Plaine beaches, RoSTI staff sought to gain knowledge and background information from them with an aim to better understand their situation and their receptivity to alternatives, including non-consumptive use options.

More than 30 invited presentations were given at community centres, schools, and various resorts around the island, sometimes in partnership with Forestry officials. More requests for presentations were received than could be accommodated due to limited time and human resources. The demand clearly shows that this is an important classroom topic, and we recommend that curriculum handbooks and other teacher-oriented resources be designed as a priority by future Project Managers.

Finally, the media provided consistent opportunities for national airing of the issues; updates on the beach patrols, and dialogue through radio call-in shows, etc. Over the course of the 2004 nesting season, for example, RoSTI staff gave 15 radio interviews, made 15 television appearances, and featured prominently in at least 4 national newspaper articles mostly monthly. The popular monthly "RoSTI Information Bulletin" was circulated throughout the entire 2004 and 2005 research seasons to readers both national and international.

Discussion with Management Recommendations

Based on research conducted and experiences now gained, the following recommendations (underlined for easy reference) are offered to address issues that arose during the biennium.

Field Research and Conservation

Extending Beach Coverage- Rosalie Bay was the geographic focus of the project. Research outside of this area was conducted in partnership with Forestry staff and other local communities, including Soufriere, Scott's Head, Salisbury, Calibishe, Woodfood Hill, Thibaud, several communities in North Eastern Dominica, and Portsmouth, among others. However, the low rate of return nesters (i.e. observing a tagged turtle in the study area more than once) across all species suggest that more attention should be given to the patrolling of other potential nesting beaches, especially those in relatively close proximity to the study site. It is a recommendation that, at a minimum of twice weekly during peak nesting seasons, early morning foot patrols be conducted at other potential nesting beaches. Beaches should be prioritised and selected based on information provided by informed residents and existing government databases.

The geography of Dominica's coastline results in a series of small- to medium-length pocket beaches; there are relatively few expansive sandy beaches. This reality makes beach coverage problematic in many ways, making it impossible or at least impractical to conduct systematic patrols island-wide. Nonetheless, regular foot patrols (documenting nesting crawls, which are then obscured by patrollers to prevent them being counted twice) would result in valuable sampling data and useful insight into the distribution, abundance and behaviour of Dominica's sea turtles.

To this end, regular patrols were conducted in collaboration with local residents, including Mr. Harald Zan (East Carib Dive), visual reporting with Mr. Derek Perryman and staff of Dive Dominica (Castle Comfort Lodge beach), Forestry officers (Point Michael beach), and the Woodford Hill police and community member Mr. Jerome Bruno, and fisheries co-operative members in Woodford Hill and Anse de Mai. It is noteworthy that the project's continued presence on the nesting beaches within the study area demonstrates the value of night-time beach patrol as an effective deterrent against poaching and for the engaging of local communities, as well – advantages that will become relatively more important as more and more nesting beaches are routinely monitored.

Forestry officers currently undertake habitat surveys on an island-wide basis approximately every three months. It is our recommendation that RoSTI staff should participate in and support (e.g. data-sharing) these surveys to the maximum extent possible. Also, one way of reducing monotony during increasing "no-turtle nights" as the season progresses is to authorize RoSTI beach patrollers to survey other potential nesting beaches on a rotation basis.

Nest Relocation- Of the three sea turtle species encountered at Rosalie Bay, the Leatherback nested most consistently near the high-water mark. In 2003, the majority of Leatherback nests, both confirmed and "suspected", were lost to erosion on Rosalie Beach and at several occasions eggs were seen laid washed and destroyed amongst rocks on La Plaine Beach. However, in 2004 and 2005, nests were relocated to high ground or into beach hatcheries; only a few "suspected nests" were subsequently lost.

The narrowness of the beaches, coupled with the very real threat of storm surges and high seas, combine to create a high risk of loss to erosion for clutches incubating on the beach at that time. In 2003 this also

included nests relocated to higher ground, which had to be relocated as they had been laid in the surf zones and had nil chance of survival in their original location due to their proximity to the tide line. Again, intervention on the part of RoSTI staff significantly reduced this risk in 2004 and 2005. To increase the likelihood of a successful hatch, it is a recommendation that based on beach profile data collected by RoSTI staff and archived by previous forestry studies, and taking advantage of the collective experience of RoSTI staff and beach patrollers, an alternative "safe zone" suitable for the relocation of otherwise doomed nests be identified prior to *each* nesting season. The site should be relatively safe from both ocean storm surge and inundation from local rivers.

It is further a recommendation that RoSTI staff, Interns, Forestry officers and/or other interesting persons be dedicated each year to the collection of beach profile data. Collected at regular intervals throughout the year, such data will document changes in beach width and slope. This information will provide insight into beach dynamics and will, over time, help to identify safe zones for otherwise doomed eggs.

Field Communication- It is a priority recommendation that community beach patrollers continue to be provided with cell phones. This increases both the ability of beach patrollers to communicate with RoSTI Project Managers, and with enforcement personnel in the event of an emergency or the occurrence of illegal activity on the beach. Cell phones serve another purpose, and that is to reduce somewhat the boredom associated with "no turtle nights". Leatherbacks have a well-defined nesting season peaking from April to June (fully extending from late February through July), and this is the peak of turtle activity at Rosalie Bay. There is a pronounced dearth of nesting activity from September to November, resulting in long periods of monotonous patrolling on a relatively small beach, … a stark contrast to the excitement of the Leatherback season.

Shelter- It is a recommendation that every effort be made to construct a 'turtle hut' on La Plaine beach, similar to the popular and useful structure already in place on Rosalie Beach. Currently, turtle watchers and patrollers have nowhere to rest or wait while waiting for a chance to see a nesting turtle on La Plaine beach.

In-water Research- A local Turtle Sighting and Reporting Network was established in 2003 in collaboration with Dive Dominica, where RoSTI Project Director Rowan Byrne encountered sea turtles firsthand during dives nearly every weekend. Boat captains also report very frequent sightings, this continued through 2004 and 2005, and is ongoing.

It is clear from observational and anecdotal information that much could be learned from initiating a more formal investigation of sea turtle distribution, abundance and behaviour in offshore waters. With this in mind, RoSTI staff have on many occasions spoken with Chief Fisheries Officer Mr. Andrew Magloire and Marine Manager Mr. Arun Madsetti concerning more organized in-water surveys. Such research may at first remain focused in Rosalie Bay, where RoSTI staffs have logged observations of juvenile Green turtles, for example, apparently foraging on rock algae at the river mouth. This is an excellent opportunity for in-water research on juveniles. Fishermen at Fond St. Jean have also reported an "abundance" of juvenile Green turtles in the South of the island, as well as Loggerheads. There are further possibilities near Calibishe, Soufriere, Portsmouth, Salisbury, and Cabrits Marine Park, Anse de Mai, Woodford Hill, Hamstead Beach, and the Calibishe and Atkinson beach area in Carib territory

These opportunities are not only very exciting avenues for research, but also represent an effective way to involve and work more closely with fishermen and fishing communities around the island, thus enhancing

the mutual exchange of information and ideally garnering broader grassroots support for research, conservation and management activities with endangered sea turtles. There is a great potential for learning from fisher communities island-wide, as fishermen frequently catch turtles at sea (and during the hunting season, clean the turtle at sea). In one circumstance a fisherman in Point Michael reported to RoSTI staff that he had caught 7 turtles in his net in October 2003; all were reportedly released unharmed.

With all of this in mind, it is a recommendation that RoSTI staff design and prepare, in close partnership with the science office of WIDECAST, the methodology for in-water research at selected sites around the island (including Rosalie Bay). Such methodology should seek to incorporate livelihood generation activities, such as the opportunity offered by Mr. John Robins (Benjo's Sea Moss) to involve fishers in the cultivation of seamoss for his food and beverages industry, based in Dominica. Mr. Robins is very supportive of research activity, and with the help of RoSTI staff he sees a chance for his project to become involved, as well, with local communities island-wide.

It is noteworthy that WIDECAST will be designing in-water census programs to study foraging populations in selected Eastern Caribbean islands during 2006-2008 as a pilot project with UNEP funding. Participants will be trained in Barbados in partnership with the Barbados Sea Turtle Project, and also in Bermuda in partnership with the Bermuda Aquarium. It is a recommendation that Dominica be included in this pilot programme as soon as practicable.

Habitat protection- Regulated multiple use areas, buffer zones, and various forms of habitat protection are among the tools that managers and concerned communities emphasise when seeking to safeguard and restore depleted natural resources. In the case of sea turtles, where poaching continues to pose a serious threat, it is a recommendation that a "Rosalie Bay Reserve" (RBR) be considered, perhaps under the authority of the SNRO special order under the Fisheries Act, similar to the establishment of the SSMR.

The RBR should encompass the entirety of nesting habitat from the Rosalie River to the southern boundary of La Plaine Beach, and from the low water mark to the line of permanent vegetation. The laws of the Commonwealth of Dominica protect the right of public access to the island's coastal beaches, and therefore any access and/or use restrictions associated with the beaches should be defined by regulations governing the RBR. A Management Plan for the reserve should define a Buffer Zone between the line of permanent vegetation (the landward boundary of the RBR) and the landward boundary of the natural rock dune at Rosalie (Coffee) Beach. It is a recommendation that no physical development occur within the RBR or within the Buffer Zone. The natural integrity of the banks of the Rosalie River should also be protected from degradation, perhaps as part of the Buffer Zone.

Similarly, it is a recommendation that La Plaine Beach be designated as a conservation area of some kind, so that conditionalities specific to the protection of sea turtles could be enacted. For example, visitors to the beach (for the purpose of 'Turtle Watching') would be required to pay a local guide, beachfront lighting would be controlled, the beach would be regularly cleaned, etc. In addition, the conservation area would generate additional awareness of the plight of Dominica's sea turtles and the laws already in place that safeguard pregnant females and their eggs and young.

Already the first steps have been taken, in that a sign was dedicated in October 2003 to emphasise the importance of La Plaine to the sea turtles of Dominica, and to urge residents to respect the law protecting the egg-bearing females and their young.

Training- It is an ongoing recommendation that training be provided to all field personnel by RoSTI and WIDECAST staff, and that training abroad be provided whenever possible.

It is a recommendation that the training of existing staff emphasise needed skills. For example, additional training for beach patrollers and Interns is needed for more effective handling of crowds, for taking a lead role in 'people management' on the beach, and for skills in accommodating turtle watching while at the same time preserving best practices with regard to protection of nesting turtles. Moreover, as more people are trained in data collection they can become directly involved in the fieldwork. Trained personnel are needed to extend the fieldwork and data collection to the north coast, where poaching is still pervasive. Some areas are particularly well suited for this; for example, Forestry has a shelter on the north coast where staff and volunteers could rest and a Fisheries Cooperative facility (with shower and storage facilities) at Woodfood Hill that could also be used.

In addition to hands-on training at the local level, it is a recommendation that additional project funds be allocated to travel, and that more effort be put into identifying local donors to underwrite these trips. It is important to the longevity of the project that local donors be identified and cultivated. In 2004 and 2005 such donors included Benjos Seamoss & Agro Processing, Ecotourism Development Programme of the Ministry of Tourism, Cornerhouse Café, Greenflash Bar and Grill, Dive Dominica, UNESCO and other sponsors. Additional funds would enable community staff to participate firsthand in successful programs in neighbouring islands, giving confidence to local efforts and building a support network for project success.

Poaching- Attempts to counteract poaching have been implemented, which is particularly important since if left unchecked, the entire nesting population of Rosalie Bay could be completely destroyed.

Since the inception of RoSTI in 2003, 6 Leatherbacks have been killed during nesting at La Plaine, along with 2 egg-bearing Green and 2 Hawksbill turtles. While clearly significantly less than in previous years (some villagers report over 25 killed in one season a few years ago, and higher numbers are reported in the North East), these numbers clearly document ongoing illegal activity in the area and point to the potential for stock collapse given the very small numbers of turtles arriving each year to nest.

The killing of nesting sea turtles is, and has been for several decades, a crime in Dominica. Aside from ecological and economic implications of this illegal activity, it is an important law enforcement issue, which must be addressed by the appropriate authorities. It is a recommendation that RoSTI staff and volunteers provide timely and complete information to law enforcement officers concerning any illegal activity of which they are aware, and that RoSTI staff offer their full and complete cooperation in any investigation of these crimes.

It is further a recommendation that, particularly where poaching is heavy, RoSTI staff investigates options available at the community level, including funding for indigenous industries or livelihood generation, and collaborate with relevant local and national agencies and groups to explore opportunities to provide poachers with alternative means of income. One possibility currently under discussion is the seamoss cultivation industry in Marigot, Wesley, and Woodfood Hill, as industry representatives have already identified a ready market for seamoss products and the need for labour and community partnerships.

Education and Outreach

Both 2004 and 2005 were substantial years for the RoSTI project as regards successful community relations. For example, community members, after receiving a call from the RoSTI project director, would quickly venture down to the beach to see a nesting female, even at 4 AM in the morning, such was the interest and excitement in getting a chance to see her. On other occasions, community members would camp on the beach for several hours, and sometimes days, travelling far and wide from all areas of the island. Calls to the *Sea Turtle Hotline* came frequently to report any activity. Calls were in the 10s weekly during the height of the season. Community members also rang the *Hotline* to report poaching activity and it was this enthusiasm and interest that led (in May 2004) to the detention of local poachers in La Plaine for sea turtle poaching, a first and unprecedented step in the history of the area. This was also a committed sign from the strong bond that was built up with local police and local inspector Mr. Cuffy Williams with the Project. This is a solid and firm base from which to continue work and progress.

At a community level, while working with local community forestry officials and village councils, substantial support was given to Dominica's first-ever Sea Turtle Week, a week-long exhibition about sea turtles featuring: an island-wide sea turtle poster competition entered by many island schools, sea turtle debates within the schools, and nightly turtle watching on both La Plaine and Rosalie Beaches. This trend was continued with two more sea turtle exhibitions at Krazy Tees Bay front Premises at Roseau, which had the added benefit of reaching cruiseship guests visiting Dominica for the day.

Sea Turtle Week enjoyed substantial local sponsorship for featured activities, including from the Forestry and Fisheries divisions and local businesses (e.g. Benjos Sea Moss). The final and third sea turtle exhibition was held at the Cornerhouse Internet Café for nearly six weeks October and November and as in all circumstances, local photographs taken of community members experiencing sea turtles were a great focus that brought people in. These activities reached hundreds of children, visitors' tour guides, and many schools from around the island on a daily basis.

The RoSTI project, often in partnership with local business, enjoyed offering various forms of community sponsorship, including to the La Plaine Progressive Sports Club and local Cricket team (which reached the final of the Harris Paints Cup!). Both the RoSTI project and the sports club obtained substantial advertising on local and national media throughout the island during this time. The sports club even re-designed their logo from a land tortoise to a Leatherback sea turtle, and RoSTI project staff assisted with the new design, which was well-received. The RoSTI project also covered the cost of new shirts and gear, as well as the design of the new logo.

Sports club team members and supporters saw the connection between live sea turtles nesting on their beaches and an increase in sponsorship and benefits to the community, all accruing from the continued presence of sea turtles in their coastal communities. In return, club members offered their services to patrol the beaches at night as Turtle Watchers and help protect nesting sea turtles. This really was a very rewarding experience for them. The local Ladies Rounders team (a form of baseball) of Riverie Cyrique was also sponsored by the RoSTI Project to aid their success in a Rounders league. This was ongoing and continued for a number of months, again showing the benefit of live turtles to further community enjoyment and life itself!

On a national scale, a young Dominican participant who works with the youth sector of the government had a sponsored trip to St Lucia to discuss youth involvement in Caribbean affairs. This was sponsored by

UNESCO, but the participant was provided with RoSTI sea turtle materials, donated photographs, T-shirts, and other materials for his presentation on the successful works his home country is doing as regards to endangered sea turtles and the betterment of local communities. He was excited and happy about the project and loved the opportunity to share, with peers and an international audience, these successful conservation models.

Rooted in a shifting national view of sea turtles, an exceptional circumstance evolved in the community of Thibaud, in late 2004. A few individuals, at their own initiative, were protecting nesting Hawksbill sea turtles and hatchlings as they crawled to the sea after hatching. This effort was fueled by knowledge of the RoSTI project and was supported within the community on all fronts. It was seen as a very positive initiative that the community, upon hearing the message being given through the media, acted locally. Upon having this initiative brought to his attention by the RoSTI Manager, the Prime Minister, Honourable Roosevelt Skerrit, approved a donation (5000 EC$) through the Ministry of Education in June 2005 to help sea turtle conservation efforts in Thibaud, support which will provide seed money for additional community action in 2006.

In total, ca. 12,000 EC$ was raised locally in goods and services in 2004 and 2005 by the RoSTI Project Manager, confirming the depth of support island-wide for the RoSTI Initiative and the goal of sea turtle survival in Dominica.

To strengthen these and many other grassroots activities, local community members were sent to different WIDECAST affiliated projects around the Caribbean, such as Nature Seekers in Trinidad, the Barbados Sea Turtle Project, and the Jumby Bay Hawksbill Project in Antigua in 2003/04. These trips were especially fruitful in that they involved local police inspectors, members from various communities, forestry officials, and Project staff, all of whom were able to avail of this skills-sharing initiative as well as opening a very detailed discussion forum for problem solving, solution development, and overall general consensus building. This is truly a substantial tool for sea turtle conservation.

Involving Children- The RoSTI project continues to focus very much on the education of children inside the classroom though its Schools Programme. It is a strong recommendation that RoSTI continue its Schools Programme in 2006, and that RoSTI staff directly involve community teachers and other educators in this outreach as much as possible. Coastal cleans-ups and "hatchling day" also involve hundreds of children islandwide and, especially in 2005, were very popular with residents.

Internship Program/ Youth Division- It is recommendation that the RoSTI Internship Programme, started in the latter part of 2003 and since inactive, be consolidated and strengthened in 2006. To attract and encourage a pool of motivated and skilled young people, the program must be challenging and organised to include a variety of tasks essential to a potential manager. For example, Interns should be involved in beach patrols, nest relocation, conducting beach profiles (i.e. documenting coastal erosion), assembling data, and talking to school children.

Beach patrols can be done on Rosalie Bay on a regular schedule, and also in collaboration with Forestry officers who undertake habitat surveys on an island-wide basis approximately every 3 months. Allowing Interns to be involved in this would expose them to another aspect of fieldwork, as well as give them a chance to work closely with the dedicated individuals of the Forestry Division. At the same time, such a program could be of a great assistance to Forestry.

Interns could also take leadership roles in organising and executing beach clean-ups. For example, RoSTI Interns could organise the beach clean-up for Coastal Clean-Up Day in the Rosalie Bay area in the villages of La Plaine, Morne Jaune, Riviere Cyrique and Grand Fond. As they become more familiar with sea turtle biology and conservation, new opportunities for Interns to make public presentations should be arranged.

'Turtle Watching' Venture- It is a foundational objective of the RoSTI project to "raise awareness of the biology and status of depleted sea turtle populations, as well as to encourage interest on the part of Dominicans to become involved in a locally run 'Turtle Watching' venture." Such a venture has the potential to provide sustainable livelihoods for community members, encourage leadership and entrepreneurial skills, and complement existing marketing strategies for Dominica as a tourist destination. It is a recommendation that RoSTI staff continue to work with community leaders and natural resource authorities to design an initiative that will accomplish conservation and community development goals.

Throughout the years, RoSTI has actively encouraged residents and visitors alike to visit the beach and witness nesting whenever possible. This is desirable for several reasons. First, it forges closer ties between the community and the project; second, the experience of seeing a nesting female offers people who have only ever seen turtle as "meat" a very moving experience and connection with their local sea turtle population; and third, it gradually prepares RoSTI staff for establishment of a more formal 'Turtle Watching' venture.

It is clear, based on experience to date, that the 'Turtle Watching' activities can become too intense for the nesting turtles. It is also clear that the activities should probably focus, at least initially on Leatherbacks. The Leatherbacks are less flighty and appear more tolerant toward observers than do the smaller turtles, particularly the shy Green turtles, meaning that visitors can receive more attention as proper research is conducted. Leatherbacks are also larger, which means that more visitors can view the whole process comfortably for a longer period of time and can see the turtle from a greater distance, relieving any concern for crowding the egg-laying process. Finally, most of the excitement surrounding sea turtles comes from seeing these "giants", for most people that is the highlight of turtle viewing.

One possible constraint to fully profitable 'Turtle Watching' is that of timing. The Leatherback nesting and hatchling season ends a few months prior to Dominica's main tourist season. However, 2003 "trials" proved that people are definitely interested in seeing sea turtles … including hatchlings. More than 25 persons consistently visited the beach on potential nesting nights. Starting beach patrolling earlier in the year, as Leatherbacks may start nesting in February, may increase overlap with peak tourism periods.

On one night in particular in 2004, during Sea Turtle Week, 70 local people waited on La Plaine beach and 50 on Rosalie, all hoping to see a Leatherback. The fact that sea turtle viewing is a night-time activity, and can involve crowds of this size, poses a blend of challenges and advantages. Dominica is a relatively quiet country, and the majority of visitors seek a relatively peaceful holiday in a natural setting. 'Turtle Watching' fits in comfortably with the marketing of Dominica as a tourism product. It also complements existing nature-oriented activities by offering a night-time option. At the same time, the remote location of many nesting beaches and the potentially late and long hours involved in a 'Turtle Watch' are factors which must be addressed by management. Also central to the sustainability of any 'Turtle Watching' activity must be the requirement that guests be accompanied by a trained community-based Guide.

A 2003 RoSTI national questionnaire (Franklin et al. 2004) polled respondents' views on the provision of transportation and refreshments, as well as the time spent on the beach. Considering the response to this particular question, allowing visitors to spend some time on the beach, providing transportation and refreshments, *and* offering a blend of cultural experience (story-telling?) and themed products (T-shirts, sea turtle curios made locally) will likely produce a saleable product. While increasing the responsibility and organisation necessary, these represent value added and also present an opportunity for local entrepreneurs (e.g. food, transportation, artisans) to benefit. A more comprehensive product may eventually provide overnight accommodations in local communities, as is already done in other Caribbean communities.

During peak Leatherback nesting season in 2004, turtle activity occurred, on average, two out every three nights, which translates into a 66% chance of "seeing something" as opposed to 33% chance in 2003. Knowing that Leatherbacks nest every 9-11 days can greatly improve these odds. There were 18 Leatherback turtle activities in Rosalie Bay during May and June, representing an average of 2 turtles per week. The odds of seeing something can also be improved by monitoring more beaches, and networking beach patrollers together (e.g. using cell phones) so that visitors waiting at an organised museum or interpretive centre at Rosalie could be called to nesting on Rosalie Beach, La Plaine Beach (15 minutes away), or Castle Bruce Beach (35 minutes away).

Unfortunately, the number of turtles arriving to nest was considerably less in 2005 than in 2004 … emphasizing the necessity of providing other activities, as well (such as story-telling), during periods of low nesting. There are other creative means of increasing visitor satisfaction by compensating for inherent unpredictability. One is to embrace the idea of seeing hatchlings, which have a significant 'cuteness factor'. Hatchling emergences can be predicted with some accuracy, have the added advantage of usually occurring at earlier times during the evening. It is a recommendation that whatever "product" is marketed, best practices with regard to interaction with endangered sea turtles and their young be emphasised (e.g. Eckert et al. 1999).

Educational Materials- Outreach in 2004 and 2005 involved teaching people (residents and visitors alike) about sea turtles, and involving them in stewardship and conservation initiatives. Most of this occurred not simply in scheduled school presentations and lectures, but informally and on an impromptu basis within communities throughout Dominica. One of the most valuable resources available to RoSTI staff was a suite of RoSTI and WIDECAST educational materials, particularly those with Dominican pictures. These were very popular among children and adults, and served as effective teaching aids and promotional tools. For example, RoSTI postcards printed with "turtle facts" and WIDECAST's species identification leaflets were in widespread demand!

It is a strong recommendation that RoSTI staff develop additional picture materials, particularly species identification sheets, posters, bookmarkers and thematic brochures. These materials will also be useful in schools where RoSTI staff are working in partnership with local teachers; e.g., curriculum units being developed in Pioneer school (Roseau) and SSMR co-visited schools by RoSTI Project Director Rowan Byrne and Marine Manager Mr. Arun Madisetti. Printing bulk orders reduces printing, shipping and freight costs. Ideally the project should have a year's worth of materials on hand at the *start* of each nesting season.

It is a recommendation that materials be developed specifically for sharing with policy-makers. For example, when visiting Village Councils, small packages or folders should be available for each Council

member to keep. These could contain photos of Dominicans working with turtles, information on local populations of sea turtles, a map of sea turtle nesting sites around Dominica, summaries of data collected by RoSTI, a copy of island legislation protecting nesting females and their young, and/or contact details for the Sea Turtle Hotline. Possibly a CD would be useful, particularly for media representatives (see also below).

Finally, it is a recommendation that the project have a large and portable RoSTI logo-banner for display at future DiveFest and other eco-tourism activities and conferences, the RoSTI Turtle Festival in La Plaine, and other public meetings, such as sponsored workshops and outreach engagements.

Media Efforts- 2004 saw the development of the new Dominican TV documentary: "Watch That Turtle". This video was produced by RoSTI staff and the Government Information Services (GIS) and had an overwhelmingly positive effect. It was aired during the second sea turtle exhibition at Krazys Tees with a major media presence and national government officials. Since then it has aired regularly during evening hours on national Dominican TV channels.

The aim was to provide an opportunity for Dominicans to share their experience of seeing nesting sea turtles up-close, and to express their feeling to fellow country folk. Children, middle-aged folks and older adults all vied for a chance to be involved and to ask that sea turtles be given a chance to live; again, this has had an overwhelmingly positive effect. The video also provides a new and substantial tool to use in local schools and science clubs. The video took 14 months to produce and was a substantial undertaking by RoSTI, as it necessitated the production of a great deal of local footage. It is a recommendation that this video be updated periodically, so that fresh footage can be incorporated.

It is a recommendation that the project continue monthly turtle reports on the radio, but with more emphasis on featuring Dominicans along with RoSTI staff. The same is true for television, where opportunities to feature community beach patrollers and others directly involved in the project should be sought.

It is a further observation that "general media", in the sense of public visibility for sea turtle management issues (and not simply the RoSTI project), is also needed. For example, emphasis might be placed on the posting of sea turtle billboard signs (such as already exist in La Plaine) at nesting beaches known for poaching activity. RoSTI could provide bumper stickers to taxi drivers at the airport and bus transporters in Roseau at the bus gathering stations. A weekly or monthly outreach section in local papers (produced by RoSTI staff) might feature a specific character, such as "Creole the Turtle" or the adventures of a sea turtle character changing every week and based on actual events. The character for the story could be prepared by a local artist, in conjunction with RoSTI project staff.

Sponsorship of Community Events- Sponsorship of village activities is a way to emphasise partnerships, support community development (beyond conservation issues), and encourage leadership. Sponsorship might involve a local musical band, Forestry or Fisheries extension program, Creole music festival, DiveFest activity, village football league, assisting a contestant for a queen show or quadrille festival, supporting a youth camp or church summer school. This type of participation shows the practical benefits of conservation.

One recommendation might be to sponsor a monthly workshop, each taking place in a different area, especially along the North coast where sea turtle nesting is reported and poaching significant. Each

workshop could be associated with a community donor, such as AT&T Wireless. The cost would vary, but is estimated at 3,500 EC$ per day. Gatherings such as this create goodwill, a chance for open-ended and frank discussion, and an opportunity for mutual learning. In a similarly way, RoSTI workshops designed for the tourism sector would encourage information exchange and enhance marketing of sea turtle related activities. To this end, it is a recommendation that outreach be designed in 2006 to target tour guides, taxi drivers, hoteliers, dive shops, car rental agencies, eco-tourism promoters, etc.

Project Support

It is a recommendation that steps be taken to generate sustainable funding for sea turtle conservation at the local level, with an aim to provide sustainable income to the project in the future. Such steps might include:

- Unique product sales, such as T-shirts, posters, caps and hats, bumper stickers with the National Sea Turtle Hotline cell number, etc. and including items featuring the RoSTI logo.
- 'Adopt-a-Turtle Campaign' or pledge to the project: this is an idea suggested by the ministry to target tourists and local businesses, and could be advertised during public presentations to tourists island-wide (cf. Appendix IV).

Equipment Needed

- Stockpile of posters, calendars, stickers, bookmarks, brochures, and other outreach materials
- Technical reports and books to share
- Dissection kit and callipers
- Medical kit for beach patrollers (and injured sea turtles)
- Digital video and still digital cameras
- Laptop computer for mobile and office-base work and public (powerpoint) presentations
- PIT tags and reader(s) to enhance tag longevity
- A supply of burnable CDs, mobile USB external storage devices

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APPENDIX I

WIDECAST

Wider Caribbean Sea Turtle Conservation Network

2004-2005 Sea Turtle Sighting Form

Rosalie Sea Turtle Initiative (RoSTI)

Dominica, West Indies

Date _____ Time _____ AM / PM Page Number _____

Observer_____ Tel/contact: _____

Location: Lat _____ Long _____ Name/Locale: _____

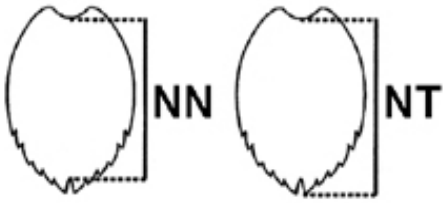
Distance between Nest (or Suspected Nest) and Landmarks, or Turtle and Landmarks:
Landmark A (name / distance) _____ / _____(m)
Landmark B (name / distance) _____ / _____(m)
Landmark C (name / distance) _____ / _____(m)

If at sea: Water Depth (m) _____ Water Temperature _____

Turtle Species: _____ Gender: ♂ / ♀ / unk

Identified by: ☐ Adult ☐ Juvenile ☐ Hatchling ☐ Alive ☐ Dead
or, ☐ Crawl/Nest Pit Crawl Width: _____ m Pattern: Symmetrical / Alternating

Size: CCL NT _____cm SCL NT _____cm CCL NN _____cm SCL NN _____cm
CCW _____cm SCW _____cm Carapace Intact? Y / N



Description / Illustration : Parasites and Injuries

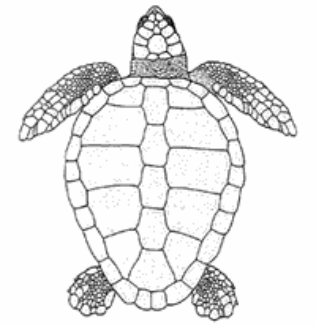
Result: ☐ Nest (eggs confirmed) ☐ Suspected Nest ☐ False Crawl (no eggs)

Notes (e.g. evidence of poaching or other threats, contact information for observer):

_____
_____
_____
_____
_____
_____

APPENDIX II

***Caretta caretta*: Loggerhead (Eng), Caguama (Sp), Caouanne (Fr)**



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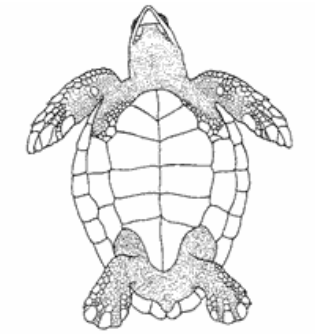

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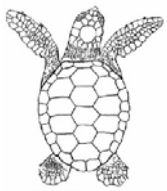


Hatchling

Head

(*) *drawings not to scale with respect to size differences between adults and hatchlings, or among species.*

Physical Characteristics

- Named for: Relatively large head (up to 10 inches [25 cm] in width)
- Length-adult: Carapace (upper shell) length of 3-4 feet (ca. 1-1.2 m)
- Length-hatchling: Carapace length of 1.7-1.8 in (ca. 44-48 mm)
- Weight-adult: to 400 lb (ca. 100-180 kg)
- Color-adult: Carapace is reddish-brown; plastron (belly) is light yellow to light brown
- Color-hatchling: Uniform in color, red-brown to grey-black

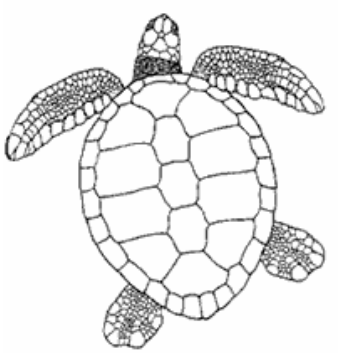
Caribbean Reproduction/Nesting

- Peak nesting: May-July
- Number of nests: On average, 3-4 per season at 13-15-day intervals
- Average "clutch size" (=eggs per nest): 100-120 eggs
- Incubation time: ca. 50-75 days

Global Status

- Endangered (World Conservation Union: IUCN *Red List*); international trade is prohibited by CITES; Protected (Annex II) by the Protocol concerning Specially Protected Areas and Wild-life (SPAW) to the UNEP *Cartagena Convention*; Protected by the Interamerican Convention for the Protection and Conservation of Sea Turtles.

***Chelonia mydas*: Green Turtle (Eng), Tortuga verde (Sp), Tortue verte (Fr)**



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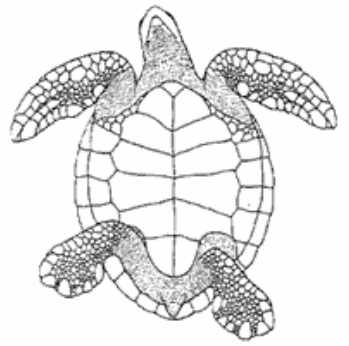

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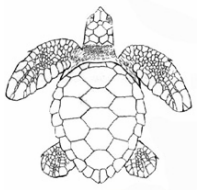
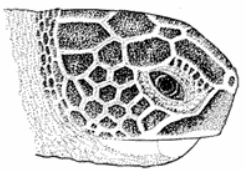


Hatchling



Head

Physical Characteristics

- Named for: Color of body fat (tinted from a diet of seagrass)
- Length-adult: Carapace (upper shell) length of 3-4 feet (ca. 1-1.2 m)
- Length-hatchling: Carapace length of 1.9 in (ca. 49 mm)
- Weight-adult: to 400 lb (ca. 120-180 kg)
- Color-adult: Carapace is mottled gray, green, brown and black; plastron (belly) is pale yellow
- Color-hatchling: black carapace, white plastron

Caribbean Reproduction/Nesting

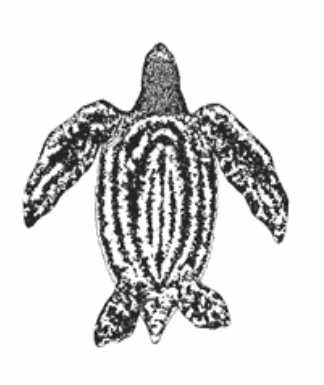
- Peak nesting: May-September
- Number of nests: On average, 3-5 per season at 12-14 day intervals
- Average "clutch size" (=eggs per nest): 110-140 eggs
- Incubation time: 50-70 days

Global Status

- Endangered (World Conservation Union: IUCN *Red List*), international trade is prohibited by CITES; Protected (Annex II) by the Protocol concerning Specially Protected Areas and Wild-life (SPAW) to the UNEP *Cartagena Convention*; Protected by the Interamerican Convention for the Protection and Conservation of Sea Turtles.

***Dermochelys coriacea*: Leatherback (Eng), Tortuga Laúd (Sp), Tortue luth (Fr)**

Adult (top)



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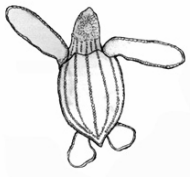

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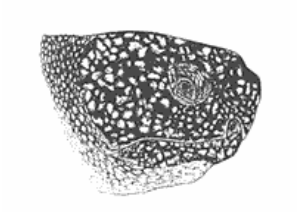


Head

Physical Characteristics

- Named for: Lack of a bony carapace (upper shell); leathery skin
- Length-adult (female): Carapace length of 4.5-6 feet (ca. 1.4-1.8 m), with 7 prominent ridges
- Length-hatchling: Carapace length of 2.4-2.6 in (ca. 60-65 mm)
- Weight-adult: 550-1400 lb (ca. 250-650 kg)
- Color-adult: Carapace and plastron (belly) both gray/black with white or pale spots
- Color-hatchling: Carapace is black with white spots, plastron is mottled black and white

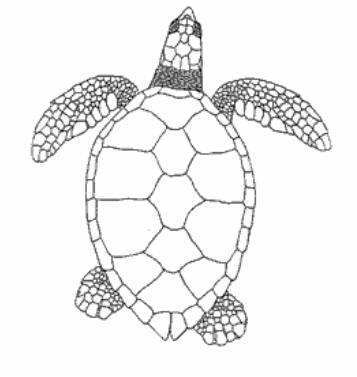
Caribbean Reproduction/Nesting

- Peak nesting: March-July
- Number of nests: On average, 6-9 times per season at 9-11 day intervals
- Average "clutch size" (=eggs per nest): 80-90 [yolked] eggs
- Incubation time: 50-75 days

Global Status

- Critically Endangered (World Conservation Union: IUCN *Red List*); international trade is prohibited by CITES; Protected (Annex II) by the Protocol concerning Specially Protected Areas and Wildlife (SPAW) to the UNEP *Cartagena Convention*; Protected by the Inter-american Convention for the Protection and Conservation of Sea Turtles.

***Eretmochelys imbricata*: Hawksbill (Eng), Tortuga Carey (Sp), Tortue imbriquée (Fr)**



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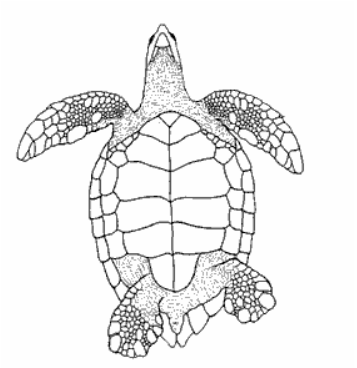

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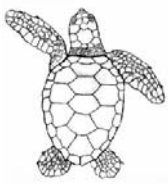

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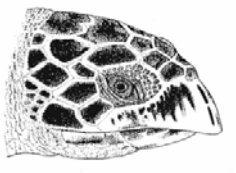


Head

Physical Characteristics

- Named for: Hawk-like beak
- Length-adult: Carapace (upper shell) length of 2-3 feet (ca. 60-90 cm)
- Length-hatchling: Carapace length of 1.6-1.8 in (ca. 40-45 mm)
- Weight-adult: 132-176 lb (ca. 60-80 kg)
- Color-adult: Carapace is brown, black, and amber; Plastron (belly) is yellow
- Color-hatchling: Uniform in color, grey or brown

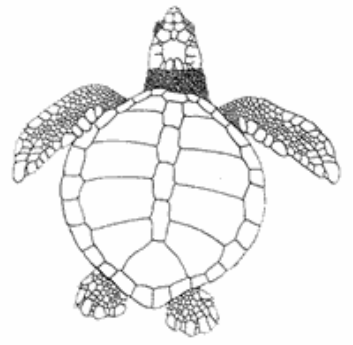
Caribbean Reproduction/Nesting

- Peak nesting: April-November
- Number of nests: On average, 4-5 times per season at 14-15 day intervals
- Average "clutch size" (=eggs per nest): about 160 eggs
- Incubation time: 50-75 days

Global Status

- Critically Endangered (World Conservation Union: IUCN *Red List*); international trade is prohibited by CITES; Protected (Annex II) by the Protocol concerning Specially Protected Areas and Wildlife (SPAW) to the UNEP *Cartagena Convention*; Protected by the Inter-american Convention for the Protection and Conservation of Sea Turtles.

***Lepidochelys kempii*: Kemp's ridley (Eng), Tortuga Lora (Sp), Tortue de Kemp (Fr)**



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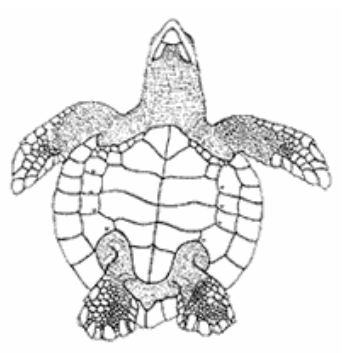

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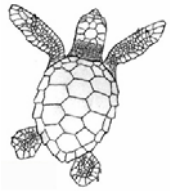
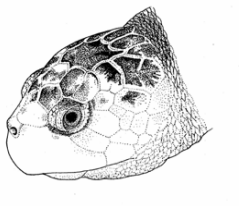


Hatchling



Head

Physical Characteristics

- Length-adult: Carapace (upper shell) length of 2-2.5 feet (ca. 60-75 cm), smallest sea turtle
- Length-hatchling: Carapace length of 1.6-1.8 in (ca. 40-47 mm)
- Weight: 75-110 lb (ca. 35-50 kg)
- Color-adult: Carapace is grey or black; Plastron (belly) is pale yellow
- Color-hatchling: Uniform in color; grayish black

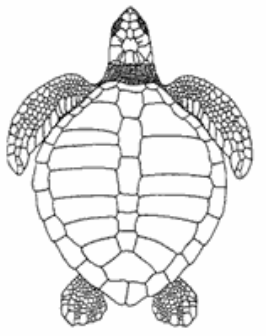
Gulf of Mexico Reproduction/Nesting

- Peak nesting: April-July (no nesting south of the Gulf of Mexico)
- Number of nests: On average, 2-3 times per season; often a daytime nester
- Average "clutch size" (=eggs per nest): 100-105 eggs
- Incubation time: about 45-55 days

Global Status

- Critically Endangered (World Conservation Union: IUCN *Red List*); international trade is prohibited by CITES; Protected (Annex II) by the Protocol concerning Specially Protected Areas and Wildlife (SPAW) to the UNEP *Cartagena Convention*; Protected by the Inter-american Convention for the Protection and Conservation of Sea Turtles.

***Lepidochelys olivacea*: Olive ridley (Eng), Golfina (Sp), Tortue olivâtre (Fr)**



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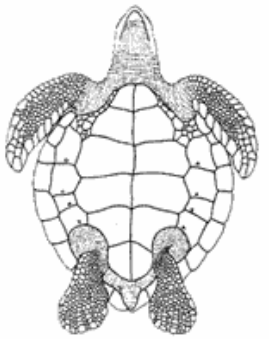

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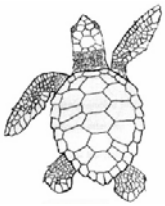
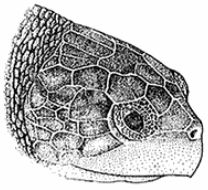


Hatchling



Head

Physical Characteristics

- Length-adult: Carapace (upper shell) length of 2-2.5 ft (ca. 60-75 cm)
- Length-hatchling: Carapace length of 1.5-2 in (ca. 38-50 mm)
- Weight: 75-110 lb (ca. 35-50 kg)
- Color-adult: Carapace is dark grey/green; Plastron (belly) is yellowish-white
- Color-hatchling: Uniform in color, grayish black

Caribbean Reproduction/Nesting

- Peak nesting: April-August
- Number of nests: On average, 1-2 times per season at 17-30 day intervals
- Average "clutch size" (=eggs per nest): 105-115 eggs
- Incubation time: about 55 days

Global Status

- Endangered (World Conservation Union: IUCN *Red List*); international trade is prohibited by CITES; Protected (Annex II) by the Protocol concerning Specially Protected Areas and Wild-life (SPAW) to the UNEP *Cartagena Convention*; Protected by the Interamerican Convention for the Protection and Conservation of Sea Turtles.

Text: Karen L. Eckert, Ph.D. (WIDECAST)
Diagnostic Drawings: Tom McFarland (Tom's Turtles)

APPENDIX III

Laws of Dominica

Forestry and Wildlife Act

Chapter 60:02, Act 12 of 1976

Amended by Act 35 of 1982

Amended by Act 12 of 1990

Chapter 60:02

Section 21

Ninth Schedule

Regulations for the taking of sea turtles

1. The word 'turtle' shall be deemed not to include the tortoise or land turtle (*Geochelone carbonaria*).

2. No person shall:
   - catch or take or attempt to catch or take any turtle between the 1st June and the 30th September, both dates inclusive,
   - catch or take or attempt to catch or take any turtle which is under twenty pounds in weight, or
   - disturb any turtle nest or eggs or take any turtle eggs, or take or attempt to take any turtle laying eggs or on the shore engaged in nesting activities.

APPENDIX IV

RoSTI
Rosalie Sea Turltle Initiative

Certificate Number 006 2005.

This Certificate certifies that

Mrs. Lisa Hoyle äka Stunt Chick

has adopted "Nica", a Giant Leatherback sea turtle that visited Rosalie Beach on May 14th 2005 laying 133 eggs - 90 yoked eggs. Her tag numbers are right flipper WC2105 & left flipper WC2106. This was her second nesting this season. She was 151cm in shell length and 116cm wide. She would have been nearly 800 lbs in weight, 6feet long & 4. 5 feet wide.

Your support is very much appreciated and all funds will be used to employ more dedicated Dominicans in protection of Dominica's endangered sea turtles that visit the island every year. Updates on her status will be sent as she appears again and again during the year.

WIDECAST
Wider Caribbean Sea Turtle Conservation Network