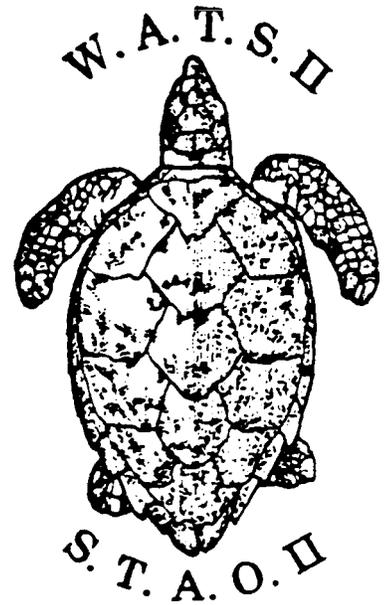


WATS II REPORT / DATA SET



**National Report to WATS II for the
British Virgin Islands**

Betrand Lettsome

10 October 1987

WATS2 046



With a grant from the U.S. National Marine Fisheries Service, WIDECAST has digitized the databases and proceedings of the **Western Atlantic Turtle Symposium (WATS)** with the hope that the revitalized documents might provide a useful historical context for contemporary sea turtle management and conservation efforts in the Western Atlantic Region.

With the stated objective of serving “as a starting point for the identification of critical areas where it will be necessary to concentrate all efforts in the future”, the first Western Atlantic Turtle Symposium convened in Costa Rica (17-22 July 1983), and the second in Puerto Rico four years later (12-16 October 1987). WATS I featured National Reports from 43 political jurisdictions; 37 presented at WATS II.

WATS I opened with these words: “The talks which we started today have the multiple purpose of bringing our knowledge up to date about the biological peculiarities of the marine turtle populations of the western Atlantic; to know and analyse the scope of the National Reports prepared by the scientific and technical personnel of more than thirty nations of the region; to consider options for the orderly management of marine turtle populations; and in general to provide an adequate forum for the exchange of experiences among scientists, administrators, and individuals interested in making contributions for the preservation of this important natural resource.”

A quarter-century has passed, and the results of these historic meetings have been lost to science and to a new generation of managers and conservationists. Their unique importance in providing baseline data remains unrecognized, and their potential as a “starting point” is neither known nor appreciated.

The proceedings document what was known at the time concerning the status and distribution of nesting and foraging habitat, population sizes and trends, mortality factors, official statistics on exploitation and trade, estimated incidental catch, employment dependent on turtles, mariculture operations, public and private institutions concerned with conservation and use, legal aspects (e.g. regulations, enforcement, protected areas), and active research projects.

Despite the potential value of this information to agencies responsible for conducting stock assessments, monitoring recovery trends, safeguarding critical habitat, and evaluating conservation successes in the 21st century, the National Reports submitted to WATS II were not included in the published proceedings and, until now, have existed only in the private libraries of a handful of agencies and symposium participants. To help ensure the legacy of these symposia, we have digitized the entire proceedings – including National Reports, plenary presentations and panels, species synopses, and annotated bibliographies from both meetings – and posted them online at <http://www.widecast.org/What/RegionalPrograms.html>.

Each article has been scanned from the original document. Errors in the scan have been corrected; however, to be true to the original content (as closely as we can discern it), potential errors of content have not been corrected. This article can be cited (with the number of pages based on the layout of the original document) as:

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*Karen L. Eckert
WIDECAST Executive Director
June 2009*

BRITISH VIRGIN ISLANDS (BVI) NATIONAL REPORT

WESTERN ATLANTIC TURTLE SYMPOSIUM II

Marine turtles have played an important role in the cultural and socio-economic development of the British Virgin Islands (BVI). Although there has never been an established commercial export of turtles, the three species that exist locally, (the hawksbill, green, and leatherback), have been extensively exploited at the subsistence level. The local turtle fishery has been family or community oriented and, although there has been a significant decline in the fishery, that trend continues today.

The leatherback or trunk fishery was not as important economically as the hawksbill / green fishery because of its seasonal nature (taking place only during the nesting months, March-June). In addition, there was not a large market for the primary product derived from the animal, which was oil. The meat and eggs were distributed in a subsistence fashion among families and the community. What this fishery lacked in socio-economic importance, however, it made up for culturally. "Trunking" is deeply rooted in tradition and mysticism. Some fishermen trace the roots of the fishery back to the days of slavery, while others believe it was actually brought over from Africa like so many other local customs.

The opportunistic poaching of sea turtle eggs (all species) remains a serious threat to sea turtle conservation. While all factors tend to indicate that the level of poaching has decreased in recent years, the proportion of nests poached per season remains unknown. It is possible that the leatherback turtle has been the most severely affected because of their restricted nesting range and the ease of nest identification. Hawksbills and green turtles have much broader nesting ranges, encompassing numerous isolated beaches on the main islands and on the offshore cayes. Presumably, this helps to offset the poaching pressure.

The conservation of marine turtles in the British Virgin Islands requires appropriate planning and enforcement that must come through adequate research and education. While the cultural and traditional uses of the marine turtles must be considered, the status of the local nesting and foraging populations should be the most important factor in any decision-making process. The status of local populations is not known exactly, but there are enough indicators to make some informed decisions. For instance, the 1986 amendment to the 1959 Turtles Ordinance lengthened the closed season and protected the trunk turtle for the first time. Survey and research project, public awareness, legislation and enforcement efforts will all contribute to an effective long-term conservation strategy.

Funds from WATS allowed a series of beach patrols to be carried out on the Northeast side of Tortola between April-July 1987. Leatherbacks were found to have nested on four (4) beaches on nine (9) occasions. It appears that three to four (3-4) females nested this year. Fishermen definitely caught one female and reports indicated that one additional female may also have been captured.

The problems of small numbers of nesting leatherbacks and the difficult access to the four or five (4-5) potential nesting beaches, makes monitoring and enforcement very inadequate with the resources available. There is a likelihood of the leatherback becoming extinct as a nesting species in the British Virgin Islands (BVI) in the near future.

Bertrand Lettsome
Conservation Officer

FIRST DRAFT

July 1987

Sea Turtle Recovery Action Plan

for the

BRITISH VIRGIN ISLANDS

Prepared by the

WIDECAST – Wider Caribbean Sea Turtle Recovery Team

**Karen Lind Eckert
Lead Team Member**

Introduction by Bertrand Lettsome

BVI Ministry of Natural Resources

I. INTRODUCTION

Marine turtles have played an important role in the cultural and socioeconomic development of the British Virgin Islands (BVI). Although there has never been an established commercial export of turtles, the three species that exist locally (the hawksbill, green, and leatherback; Section II) have been extensively exploited at the subsistence level. The local turtle fishery has been family or community oriented and, although there has been a significant decline in the fishery, that trend continues today.

Hawksbill and green turtles are mainly captured by the use of nets, while leatherbacks are captured on the beaches during nesting. The fishery can be separated along these lines because there is no overlap; the leatherback fishermen, known locally as 'trunkers', are not involved in the hawksbill and green turtle fishery, and vice-versa. The hawksbill and green turtle fishermen, known locally as 'turtle fishermen', are generally true fishermen who set turtle nets in addition to their fish traps. Thus, the marine turtle fishery in the BVI includes two separate entities: the leatherback ('trunk') fishery and the hawksbill / green fishery. As a result, two distinct sets of cultural and socio-economic traditions with regard to marine turtles have evolved.

The hawksbill / green fishery was widespread historically, being concentrated in the major fishing villages on each island (e.g., The Settlement, Anegada; North Sound and The Valley, Virgin Gorda; East End, Long Look, Baugher's Bay, and Road Town, Tortola; Great Harbour and East End, Jost Van Dyke). Nets were set throughout the territory from Anegada to Jost Van Dyke. The art of knotting, hanging, setting and hauling turtle nets, along with the handling and processing of the animals, was passed on from generation to generation within families and through apprenticeships. Turtle meat was an important and readily available source of protein. Today, during the season when local restaurants are permitted to buy and sell turtle meat (1 December-31 March, section 4.21) it is still a popular delicacy, commanding a similar price to conch and whelk.

Traditionally, the shells ('turtle backs') of both hawksbills and greens were cured, cleaned and sold. In those early days (ca. 1940s), shells, particularly hawksbill, were in demand by local craftsmen and thus fetched a good price. The sale of shells was a major source of income for the fishermen. Apparently, there was also some export of shells that were purchased from the fishermen by wealthy residents. Soon, however, the onset of plastics and substitutes, perhaps coupled with international pressure for sea turtle protection, drove the regional demand down and the shell trade declined. From then until the present time the shells have been sold locally, given away, or kept by the fishermen to be mounted in private homes, clubs, restaurants and hotels. The local artisanry also declined and today is virtually non-existent (Section 3.3).

The leatherback, or trunk, fishery was concentrated in villages close to leatherback nesting beaches on Tortola and Virgin Gorda. This fishery has declined significantly and, by 1986 when a closed season was established for trunk turtles (Section 4.21), the harvest had been reduced to the nesting beaches along the northeast coast of Tortola. The fishermen claim that they never took both turtle and eggs in accordance with Sections 3(d) and (e) of the now amended 1959 Turtles Ordinance, but this cannot be verified. In any event, nesting populations have seriously declined. Fishermen claim that as many as six trunks per night nested in the 1920's on beaches such as Josiahs and Long Bay, Lampert (Tortola) where only two or three females nest per season today. There are also numerous beaches where the animals no longer nest at all (e.g., Trunk Bay, Virgin Gorda; Little Bay, Lampert, Tortola White Bay, Guana Island).

The leatherback or trunk fishery was not as important economically as the hawksbill / green fishery because of its seasonal nature (taking place only during the nesting months, March-June). In addition, there was not a large market for the primary product derived from the animal, which was oil. The meat and eggs were distributed in a subsistence fashion among families and the community. What this fishery lacked in socio-economic importance, however, it made up for culturally. 'Trunking' is deeply rooted in tradition and mysticism. Some fishermen trace the roots

of the fishery back to the days of slavery, while others believe it was actually brought over from Africa like so many other local customs.

Over the years knowledge has been gained about the trunk turtle (the nesting cycle, the arts of 'turtle watching', capture, slaughter and preparation) through practical experience. There is also a certain 'mystical knowledge' about the animals that is not explained so easily or logically. The sighting of the silhouette of a trunk turtle in the clouds (with the head of the turtle pointing in the direction of the chosen nesting beach) is the most widely experienced phenomenon; it is commonly experienced at the community level with everyone being capable of recognizing the silhouette and sounding the alarm to watch for the expected animal. I have personally experienced this silhouette on numerous occasions from when I was a small boy until now and there are several documented cases of trunk turtles being caught because of these signs in the sky. Noises in the bushes, sticks breaking, whistling, human voices, strange odours and ghosts of deceased trunk fishermen have been reported to take place just prior to the emergence of the turtles on the beach. When a trunk was slaughtered, the head, back, belly plate (plastron), flippers and internal fat were boiled in seawater in a copper kettle on the beach. As the oil rose to the surface, it was siphoned off and bottled (Section 2.3). Remains and entrails were buried well behind the beach; care was taken not to contaminate the beach or the near shore water with any part of the turtle because it was believed that this would prevent turtles from nesting in the future.

While the tough meat of the trunk was not as popular as that of the hawksbill or green turtle, the eggs and the oil were (and are) prized for their reputed aphrodisiac qualities. In addition, trunk oil has considerable medicinal value, having been used traditionally in the BVI for the treatment of severe colds and other general respiratory diseases.

The opportunistic poaching of sea turtle eggs (all species) remains a serious threat to sea turtle conservation (Section 4.231). While all factors tend to indicate that the level of poaching has decreased in recent years, the proportion of nests poached per season remains unknown. It is possible that the leatherback turtle has been the most severely affected because of their restricted nesting range and the ease of nest identification. Hawksbill and green turtles have much broader nesting ranges, encompassing numerous isolated beaches on the main islands and on the offshore cays. Presumably, this helps to offset the poaching pressure on these species. It is currently illegal to take sea turtle eggs (of all species) April 1-November 30, inclusive (Section 4.21).

The BVI participates in a number of regional and international treaties and organizations that are concerned with the conservation of sea turtles. These include the Convention on International Trade in Endangered Species (CITES), the Cartagena Convention (Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, UN Environment Programme, 1985), the Western Atlantic Turtle Symposium (WATS), and the Wider Caribbean Sea Turtle Conservation Network (WIDECAS). In addition, the hawksbill, green and leatherback turtles are listed as endangered under the First Schedule of the 1976 BVI Endangered Animals and Plants Ordinance.

In 1985, the BVI Ministry of Natural Resources, reflecting government policy, made the conservation of sea turtles a priority. A joint research project (the BVI Sea Turtle Survey) was initiated by the National Parks Trust and the Conservation Office of the Ministry of Natural Resources. Funding for the project was solicited locally as well as from WATS.

In 1986, technical assistance was sought from Ms. Karen Eckert, former Director of the Sandy Point Leatherback Research Project on St. Croix, USVI. Public awareness and education programs about marine turtles were started and continue through public lectures, classroom slide shows, radio interviews and newspaper articles. A volunteer network has been established recently under the guidance of the WIDECAS concept to assist in data collection and population monitoring for the BVI Sea Turtle Survey. The network consists of students, divers, fishermen, boat captains, government personnel, and other interested citizens. In April 1987, a twice-weekly

boat survey of the inaccessible beaches of the northern coast of Tortola and the northeast cays (Guano Island to Scrub Island) was initiated. This effort will concentrate on leatherbacks until late June, and then, until October, beaches will be surveyed where hawksbill and green turtles have been reported to nest.

The conservation of marine turtles in the BVI requires appropriate planning and enforcement that must come through adequate research and education. While the cultural and traditional uses of the marine turtles must be considered, the status of the local nesting and foraging populations should be the most important factor in any decision-making process. The status of local populations is not known exactly, but there are enough indicators to make some informed decisions. For instance, the 1986 amendments to the 1959 Turtle Ordinance lengthened the closed season and protected the trunk turtle for the first time (Section 4.21). Survey and research projects, public awareness, legislation and enforcement efforts will all contribute to an effective long-term conservation strategy.

II. SPECIES AND DISTRIBUTION

2.1 *Caretta caretta* (Loggerhead sea turtle)

There are no indigenous common names applied to the species; the preferred name is "loggerhead". The loggerhead is recognized by its large head, thick, somewhat tapered shell (carapace), and characteristically heavy encrustation of invertebrate epifauna (especially barnacles). The large head and strong jaws for which the species was named are necessary adaptations to a diet of molluscs and hard-shelled crabs; tunicates, fishes, and plants are eaten. Adults attain a carapace length of 120 cm (straight line, nuchal notch to posterior tip) and weigh up to 200 kg (Pritchard et al. 1983).

The species has a predominantly temperate distribution, with the greatest numbers of nesting females recorded along the Atlantic coast of Florida (USA) and on Masirah Island (Oman). Nesting is occasionally reported along the Caribbean Coast of Central America (e.g., Belize, Nicaragua), but only rarely in the West Indies (e.g., Puerto Rico, Dominican Republic, Jamaica). Loggerheads are not known to nest in the BVI.

Loggerheads are periodically net-caught in the BVI, generally off the Island of Anegada. The fishermen report that the meat is disliked (too oily) and that the turtle is often released unharmed when caught. Winston Leonard (Leonard's Sea Food, Ltd.), a resident of Tortola with a close association to the fishing community, reports that four loggerheads were caught in 1985 and three in 1984. There are no data available to specify what age/size classes are caught most often, or whether the loggerhead is a year-around resident.

While the loggerhead presumably forages in BVI waters, dietary requirements are not known, nor have preferred foraging areas been delimited. The species is believed to be considerably rarer in BVI waters than either the green turtle or the hawksbill.

2.2 *Chelonia mydas* (Green sea turtle)

There are no indigenous common names for the species other than "green turtle", or "turtle". The green turtle is recognized by its round, blunt beak (slightly serrated) and smooth carapace plates (scutes) that do not overlap as they do on the hawksbill sea turtle (Section 2.4). The carapace is generally devoid of barnacles. Adult green turtles in the eastern Caribbean (West Indies) attain weights of 230 kg, considerably larger than their conspecifics in Central America (150 kg). Adults generally measure 95-120 cm, straight line carapace length (nuchal notch to posterior tip), and are most common in the BVI during the summer months. Juveniles of varying sizes are present throughout the year.

Green turtles feed primarily on sea grasses (*Thalassia*, *Syringodium*, *Halodule*), maintaining feeding "scars" by returning to the same area of sea grass meadow to forage every day. The scars are maintained by regular cropping for several months and the new growth, rich in vitamins and nutrients and low in lignin and other structural materials, is preferred. When the cropped grasses show signs of stress (blade thinning, lengthening inter-nodal distance), the turtle abandons the scar and moves on another. Known foraging areas in the BVI are summarized in Table 1.

Green turtles have been traditionally netted in the BVI, and occasionally speared. There are also accounts of fishermen cornering green turtles in the shallows of Trellis Bay (Beef Island) and literally running them onto the beach. Nets set within a kilometre of shore commonly yield green turtles and sometimes small hawksbills, while those set further away (2-3 km) catch predominantly hawksbills. All sizes, ranging from about 24 cm to mature adults are landed. There is currently no export of green turtles; those not sold to local restaurants are sold to or shared with members of the community.

People from St. Martin (and perhaps other nations of the Lesser Antilles) once travelled to Tortola twice a year to purchase carapaces of both green and hawksbill turtles; presumably the shells were marketed on other islands. This activity has markedly declined in recent years as fewer green turtles have been landed in the BVI.

It has been reported that 600 green turtles were landed in 1981, and an additional 100 caught incidentally (Fletemever 1981). Winston Leonard estimates that 250 greens were landed in 1983, 225 in 1984, and 200 in 1985. His figures were computed by doubling the reported catch on the island of Anegada where most of the turtles are caught. Informed opinion in the Ministry of Natural Resources concurs with Leonard's figures, while a former Fisheries Officer tends to believe that the current catch may be closer to that reported in 1981. Presumably, the catch will decline significantly when the 1986 amendments to the 1959 Turtle Ordinance (Section 4.21) take effect.

All parties agree that the catch of green turtles is declining, but the reasons are not clear. Some fishermen maintain that catches have declined simply because there is no real market for the turtles anymore; thus, fewer are brought in. Others concede that the turtles have been over-exploited and this has precipitated population declines that have resulted in reduced catch per unit effort; consequently, many fishermen have turned to more abundant commercial fishes for their livelihood and to conch and lobster which bring high prices. The over-exploitation hypothesis is supported by older residents who report a great abundance of sea turtles (both nesting and in the water) when they were young, far more than are present now. Given that several hundred turtles are landed annually without regard for the number of turtles present (and that eggs are widely collected), this contention seems reasonable.

Green turtles probably still nest throughout the BVI, though nowhere in large numbers. Information is scarce as to which beaches are most important to the species; known nesting sites are summarized in Table 2. Green turtles prefer to nest on open beach platforms, as opposed to rocky or vegetated beaches. A deep pit (1.5-2 m wide and 1 m deep) and a symmetrical crawl (1-1.2 m in diameter) leading to and from the ocean characterize nests. Gravid females will cross-submerged coral and rock to reach suitable nesting beaches. It is not known how many nests a female will deposit during a given season, but it is believed (based on information available from other areas) to be 3-6. 120-150 yolked eggs are laid per nest; nests are commonly deposited on 12-14 day intervals. Nesting is nocturnal.

2.3 *Dermochelvs coriacea* (Leatherback sea turtle)

The leatherback turtle is locally known as the 'trunk'. Leatherbacks are the largest and most pelagic of the sea turtles, weighing 300-500 kg. Leatherbacks lack a bony shell and cornified epidermal scales; the smooth, black skin is spotted with white. The carapace is strongly tapered,

generally measures 130-165 cm in length (straight line, nuchal notch to posterior tip), and is raised into seven prominent ridges. Powerful front flippers extend nearly the length of the body.

Leatherbacks are seasonal visitors, migrating from temperate foraging grounds to nest on BVI beaches between March and July. All indications are that historical nesting was higher than it is now. Some BVI beaches were named after the leatherback turtle (e.g., Trunk Bay, Virgin Gorda) and once supported leatherback nesting (Section 1). Few beaches support leatherback nesting today (Table 2). An active subsistence fishery directed toward the species for most of this century has surely contributed to the population decline. Five "cells" of leatherback, nesting may still exist, the primary one being five to six kilometres in length and including the high energy beaches on the northeast coast of Tortola from Long Bay (Beef Island) to Trunk Bay (Tortola). Less important areas are potentially: (1) Anegada; (2) Virgin Gorda (Valley Trunk Bay used to support leatherback nesting, but Winston Leonard reports that they have been exterminated); (3) Peter Island; and (4) Sandy Cay/Jost Van Dyke.

The leatherback fishermen (trunkers) are currently few in number and are, for the most part, elderly. There are several mystical aspects to the trunk fishery; the fishermen speak of music, unexplained movements in the vegetation, and maintain that they see turtle-shaped apparitions in the clouds that point to the beach where the female will lay her eggs. The unique cultural ties to the trunk turtle prompted initial efforts by the BVI Ministry of Natural Resources to study and protect the remaining BVI leatherbacks.

Traditionally leatherbacks have been killed for meat and oil. Trunk fishermen report that fifty to sixty gallons of oil can be rendered from a "big" leatherback and perhaps 35 from a "small" one. The exact figure is difficult to estimate because the oil routinely is poured into assorted household containers and the absolute volume is rarely calculated. One source reported that 15-20, 40-ounce bottles of oil were obtained from each turtle. Prices apparently range from \$20-\$40 per 40-ounce bottle. Drinking the oil "makes you strong" and sometimes is reputed to have aphrodisiac qualities. The oil is used most commonly for medicinal purposes, generally in cases of respiratory congestion.

The trunk fishermen await the nesting females during the hours of high tide believing that this is the most likely time of arrival; the full moon is preferred. When a turtle comes ashore she is flipped over onto her carapace, a machete is used to cut a hole in each front flipper, and her front flippers are tied over her plastron (belly). She is left until morning when the whole village community comes to share in the harvest. Women bring pans to carry chunks of meat home and the men dismember the turtle and boil it in large caldrons on the beach to render the oil. Traditionally, some oil is shared with the community and the rest is sold locally. Sales have dropped in recent years, however, and the lower demand lessens the desire of the young men to perpetuate the fishery.

Leatherbacks were afforded legal protection for the first time in 1986 (Section 4.21) and the taking of nesting females is expected to subside. There is, however, no enforcement capacity and it is yet to be seen how effective the closed season (April-November, inclusive) will be. While less than six leatherbacks have been killed per annum over the last decade, it is possible that this low number represents a majority, if not all, of the leatherbacks nesting annually on Tortola. Leatherbacks may still nest on Sandy Cay and apparently nest in low densities on a few beaches on Virgin Gorda. There are also infrequent reports of nesting on the western shores of Anegada.

A recent threat of unknown magnitude involves the catching of leatherbacks on long lines baited with squid. Foreign (USA) vessels pay the government of the BVI a fee of US \$7,000 (1987) per season (November-May, inclusive) to fish swordfish using long lines. The lines (ca. 35 miles in length) are set north of Anegada in 1,000-2,000 fathoms of water; hooks hang at 50 fathoms. Incidental catch is reported to include many nontarget species, sea turtles as well as commercial fishes important to the livelihood of local fishermen on Anegada. The Fisheries Officer reports that a leatherback was hooked in March of 1987 and released, apparently

unharmd after the hook and line were cut. There is no information about often sea turtles are incidentally caught in long line operations and it is critically important that this information be collected.

2.4 *Eretmochelvs imbricata* (Hawksbill sea turtle)

A narrow, pointed beak with which it pries sponges and other soft-bodied organisms from the reef distinguishes the hawksbill. The carapace is often posteriorly serrated and the carapace scutes overlap, like shingles on a roof. Adults rarely exceed 80 kg and a carapace length of about 90 cm (straight line, nuchal notch to posterior tip). Bright mottled coloration (brown, orange, gold) is common.

Hawksbills have proven to be difficult animals to study and very little is known about Caribbean populations in general. Gravid females often nest on tiny, isolated beaches (including those flanked by exposed coral and rock) that are hard for biologists to reach on a consistent basis. Nesting occurs with little seasonality throughout most of the year. The species is believed to be relatively sedentary; nesting and foraging areas may be adjacent to one another. Nesting females are easily frightened and routinely retreat as far as possible into supralittoral vegetation (e.g., *Coccoloba*) before nesting. Consequently, little evidence of the nest exists aside from a faint asymmetrical crawl (about 0.7 m wide) leading to and from the ocean. Known nesting areas are summarized in Table 2.

Hawksbills are generally net-caught in BVI waters, but are sneered occasionally. They are found most often in nets that are set some distance from shore (often 3-4 km) in reef areas. Size classes from 24 cm to mature adults are landed, although the smaller turtles are surely below the legal 20 pound limit (Section 4.21). Known foraging areas are summarized in Table 1.

The exquisite beauty of the shell scutes has long played a central role in jewelry and ornamentation in the Caribbean. Buyers from the Lesser Antilles (especially St. Martin) have been known to purchase hawksbill shell (known as 'tortoiseshell') on Tortola, presumably for resale on other islands. This activity has declined in recent years (Section 1). Some imported tortoiseshell jewelry was found for sale in Road Town, Tortola, in 1987 (Section 3.3).

The number of hawksbills harvested has declined slightly in recent years. According to Winston Leonard, approximately 75 hawksbills were landed in 1965, 75 in 1984, and 100 in 1983 (as calculated by doubling the number of landings recorded for Anegade). Fletemever (1961) reported that 300 hawksbills were landed in 1961 with an additional 100 incidentally caught. It is generally believed that there has been a decline in stocks over recent decades, and few fishermen currently target hawksbill turtles.

2.5 *Lepidochelys kemp* (Kemp's ridley sea turtle)

There are no records of Kemp's Ridley sea turtles foraging or nesting in the BVI.

2.6 *Lepidochelys olivacea* (Olive ridley sea tTurtle)

There are no records of Olive Ridley sea turtles foraging or nesting in the BVI.

III. STRESSES ON SEA TURTLES IN THE BRITISH VIRGIN ISLANDS

3.1 Destruction or Modification of Habitat

Briefly, the destruction or modification of terrestrial (beach) habitats has been accomplished by sand mining (Section 4.131), shorefront development (Sections 4.132, 4.133), roads and fences. Marine degradation has resulted primarily from dredging and indiscriminate mooring

(Sections 4.111, 4.147). The bleaching of reefs (Sections 4.111, 4.142), ocean dumping (Section 4.144), and upland deforestation have caused problems to a lesser extent.

3.2 Disease or Predation

There are no data on the extent to which disease affects sea turtle populations in the BVI. Natural causes of mortality differ among life stages, but it can be assumed that beach erosion, crabs and birds take eggs and hatchlings; sea birds and reef fishes take hatchlings and sharks take juvenile and adult sea turtles. In contrast to the situation in the neighboring United States Virgin Islands (USVI), there are few problems with feral or exotic animals. Mongooses (*Herpestes auro-punctatus*) are present on Tortola and Jost Van Dyke, but the depredation of sea turtles nests is not reported. Wild dogs are few in number and do not constitute a problem for sea turtles at this time.

3.3 Over-Utilization

Product demand (jewelry, shells, curios, trunk oil) and restaurant demand (meat, soup) have both contributed to the decline of sea turtle stocks in the BVI. In addition, the personal consumption (as opposed to commercial sale) of meat and eggs has traditionally affected all three of the most commonly occurring sea turtle species, green, hawksbill, and leatherback (trunk). The BVI is fortunate in that it has never had a commercial import/export industry in turtles, and thus has not experienced the dramatic population declines that have accompanied such ventures in other nations.

In 1987, turtle products were for sale in Road Town, Tortola. In one store tortoiseshell (hawksbill shell) bracelets and earrings were offered at US \$15.00 each. The products were imported but the source country was not known; the clerk expressed the opinion that the items were high priced and difficult to move and probably would not be ordered again. In a second store, bracelets for US \$9.00 and rings for US \$8.00-\$10.00 were labeled "Farmed Green Turtle Products" from the Cayman Islands. Importation of sea turtle products is illegal under the BVI Endangered Animals and Plants Ordinance (1976), but it is apparently legal to transfer Cayman products among British territories. The sale of all sea turtle products, farmed or not, logically should be banned because they are intended for sale to tourists who will have them confiscated upon entry into the United States or the United Kingdom.

An artisan in The Valley (formerly Spanishtown), Virgin Gorda, reported that tortoiseshell had not been offered for sale on that island since perhaps 1964. He used to buy the scutes locally and fashion them into jewelry, but hassle from divers and USVI enforcement officers prompted him to abandon the art. Scutes were purchased from turtles that had been killed for meat; turtles were not killed specifically for ornamentation. Generally, the scutes were removed after soaking the carapace in water, but sometimes the entire shell was purchased and polished for sale. Whole shells from juvenile and adult hawksbills and greens, obtained before the present concern for the status of sea turtle species, grace the walls of local restaurants, hotels, and businesses. Whole shells rarely are offered for sale in local gift shops now but juvenile hawksbill shells were reported for sale in the airport restaurant (Beef Island) in 1986. Fishermen report that shell used to bring \$16-\$35 a pound, but there is no market today.

Restaurant demand has traditionally focused on the green sea turtle and locally popular dishes were common restaurant fare before the 1986 amendments to the Turtles Ordinance (Section 4.21) extended the closed season from April through November. Turtle stew was a high price item, selling for approximately US \$7.00. The availability of turtle in local restaurants is expected to decline following passage of said amendments. At least one restaurant in Road Town, Tortola, contacted the Conservation Officer (BVI Ministry of Natural Resources) in April of 1987 to ask advice concerning frozen sea turtle left in the freezer that could not then be sold because the new closed season had commenced. These transition problems are easily solved,

and it is heartening to see such community awareness and a willingness to cooperate with the new law.

3.4 Inadequate Regulatory Mechanisms

A basic problem with respect to environmental law enforcement in the BVI is that there is no enforcement branch specifically dedicated to the protection of natural biotic and abiotic resources. Police officers are responsible for enforcing all legal statutes in the Islands and, understandably, there is a distinct lack of personnel available for patrols of beaches, markets, boat landings and open water. Officers often lack an awareness of conservation ordinances and regulations. In February 1986, a workshop entitled "Environmental Law Enforcement" was sponsored by ECNAMP and held on Tortola. All government Ministries were involved. The purpose of the workshop was to bring conservation law to the attention of all parties. Workshops such as this should be repeated regularly.

The Fisheries Officer has the power to enforce fisheries laws and has recently been given a boat to allow him to patrol offshore areas regularly. This should have a significant positive impact on the degree to which fishermen respect existing laws. There is a general sentiment among the fishermen that they will begin to follow the regulations as soon as the government makes some effort at enforcement. Otherwise, they feel that they will be 'missing out' by obeying the laws while their competitors ignore them. Further discussions of law enforcement are offered in Sections 4.123, 4.22 and 4.24.

3.5 Other Natural or Man-made Factors

Hurricane Frederic (September 1979) devastated some reefs in North Sound, Virgin Gorda, but neither Hurricane David (August 1979) nor Hurricane Allen (August 1980) caused significant damage to BVI reefs (Rogers et al. 1982).

IV. SOLUTIONS TO STRESSES ON SEA TURTLES IN THE BRITISH VIRGIN ISLANDS

4.1 Manage and Protect Habitat

The decline in sea turtle stocks has occurred in concert with the depletion of fisheries resources in general. Fishermen, whether part-time or full-time, consistently agree that fishing is not what it used to be. Easily accessible areas that were once lucrative fishing spots are now not worth visiting. This is true regardless of whether the targeted species are fishes, lobsters, or conch. Statistics for Anegada, where the majority of fish are caught in the BVI, are most telling. Koester (1987) reports that fish, lobster and conch have all declined in Anegadan waters over the last several decades and quotes one fisherman saying that he now sets twice as many traps (40 vs. 15-20) but only catches one-third (140 pounds vs. 400 pounds/week) of what he hauled twenty years ago. Other fishermen reported that they now set three times the number of traps that they once did. Furthermore, not only are fewer fish caught per unit effort, they are uniformly smaller. The use of spearguns, SCUBA, and bleach and other chemicals have all added to resource depletion as well as to overall environmental degradation (Koester 1987). Habitats such as coral reefs and sea grass beds should be protected not just because they are important to endangered sea turtles but because they are the basis for the livelihood of many BVI residents.

4.11 Identify essential habitat

This is a very difficult task for a nation consisting of more than 40 islands (29 with coastlines greater than one kilometre in length) and approximately 800 square kilometres of area (Fletemeyer 1981). The BVI has jurisdiction over 948 square miles of shelf (less than 40 fathoms) and 83,000 square miles of deeper water. This makes the sea greater than 99% of the BVI territory (ECNAMP 1984). There are numerous reefs and sea grass beds (Maps 1, 2, 3) and

neither the government nor the private sector has the financial means or the manpower to survey them all. However, in lieu of a systematic national survey, valuable data can be gathered by divers, fishermen, and recreational boaters. Divers who lead SCUBA or snorkelling trips for tourists visit the same areas repeatedly and should be encouraged to keep records of turtles encountered as a means of monitoring stocks in localized foraging areas. Similarly, nesting activity can be monitored by volunteer activists and reported on a regular basis.

4.111 Survey foraging areas

Although valuable survey and biological data are available for the seagrass and reef communities of the BVI (ECNAMP 1980; Rogers et al. 1982; Dunne and Brown 1979), there is little information related to the specific use of these environments by marine turtles. Continuing efforts to refine existing knowledge are sponsored by the BVI Ministry of Natural Resources, National Parks Trust, Dive Operators Association, and the local WIDECAST network. Locations where green and/or hawksbill turtles have been reported surfacing and/or foraging are summarized in Table 1.

Sea grass meadows are essential in the diet of green sea turtles (Section 2.2) and are very important to the ecology of coastal areas. Sea grass roots stabilize the seabed and provide foraging habitat for fishes, conch, sea urchins, sea stars and many other invertebrates. Sea grass serves as a critical developmental habitat for several commercially important species. Much of the oxygen produced in the near shore water is generated in the sea grass beds, and these areas also contribute to the clarity of littoral zones by absorbing animal wastes and stabilizing sediments (ECNAMP 1981).

In the BVI, sea grass communities have been adversely affected (or destroyed) by upland deforestation, coastal land reclamation, dredging, mooring and more rarely by pollution from sewage and agricultural chemicals. The islands, characterized by steep slopes, shallow soils and periods of drought and heavy rain, are vulnerable to erosion that releases large amounts of sediments into near shore environments (ECNAMP 1981, 1984). Mooring can also result in sediment loading. Sea grasses in Manchineel Bay (Cooper Island) and North Sound (Virgin horde) are described as unhealthy; gaps of bare sand result from boat anchoring (Salem 1980; ECNAMP 19E1; Rogers et al. 1982).

Coral reefs are highly productive and of great economic importance. They serve as critical developmental habitats for commercially important species of fish and lobster. They protect coastal property and development investments by dissipating the energy of storm swells. In addition, they are utilized by green turtles for sleeping and shelter and are important foraging sites for hawksbills (Section 2.4). Reefs are easily damaged by bleaching, mooring, siltation, and specimen collecting. Bleaching in Horseshoe Reef (Anegada) has been reported recently. If allowed to continue, this activity will result in the death of vast communities of coral. Fishermen from Anegada claim that the bleaching is practiced by Puerto Ricans (probably from the USVI) and that the offenders are seeking lobster (Section 4.142).

Private mooring sites have been established in several areas of the BVI. Public moorings are available at the Wreck of the Rhone Marine Park in order to accommodate and regulate increasing boat traffic; they have been successful at mitigating damage resulting from persistent and indiscriminate anchorage. While permanent moorings are expensive to establish and maintain they should be viewed as an important option for the protection of fragile benthic communities (Section 4.147).

Leatherback sea turtles are not reported foraging in the littoral zone. They do not feed in sea grass meadows or coral reefs but rather upon deep-water species of medusa. Thus, they remain in deep waters between nestings and pass through the littoral zone only to reach suitable terrestrial nesting habitat.

4.112 Survey nesting habitat

The first attempt to draw together existing fragments of information relating to the utilization of beaches by nesting turtles was made by the Eastern Caribbean Natural Area Management Program (ECNAMP) in 1981. There was no original survey work in the ECNAMP program and no criteria of frequency or density of sea turtle nesting, nor were species identified (Mans 4, 5, 6). The first comprehensive attempt to survey nesting beaches in the BVI was initiated by John Fletemeyer for the Western Atlantic Turtle Symposium (WATS I). Fletemeyer conducted his survey over 12 days in July of 1981. The data, while understandably superficial, provides a starting point-for future efforts.

In 1985, the BVI Ministry of Natural Resources and the National Parks Trust targeted sea turtles for survey and study (BVI Sea Turtle Survey, Section I). Scientists were invited to train Ministry and Park personnel in the details of sea turtle natural history, and substantial public interest and media attention has been generated. Volunteer efforts to report sea turtles nesting are now underway and there are high hopes that the resulting data will greatly improve the ability of BVI biologists and managers to monitor important breeding beaches.

What is known currently of the nesting distribution of leatherbacks, greens, and hawksbills is summarized in Table 2. It is important to note that these data are preliminary. It is particularly important to seek verification as to whether green turtles or hawksbills (or both) nest on a given beach; currently there is little evidence to suggest that these species have been correctly identified consistently.

4.12 Develop area-specific management plans for important foraging and nesting areas

There are no specific management plans currently in place in the BVI for marine turtles. However, several proposed Park sites potentially could offer protection to locally occurring sea turtles (e.g., Anegada, Sandy Cay). It is imperative that the most important nesting and foraging areas be delineated as soon as possible, so that action can be taken to designate sensitive areas.

Area-specific management may involve a wide array of options, from designation of an area as a Park or protected area (and enforcement of existing regulations barring the take of turtles and eggs) to more elaborate solutions such as the establishment of a hatchery for eggs threatened by erosion or feral animals. In any case, mooring (Section 4.147), dredging (Section 4.147), sand mining (Section 4.131), sewage and garbage disposal (Sections 4.143, 4.144), land reclamation (Section 4.147), artificial lighting (Section 4.132), and the construction of seawalls and jetties (Section 4.133) should be closely evaluated in important foraging and nesting areas. Excellent guidelines for selected management techniques are available in the Manual of Sea Turtle Research and Conservation Techniques (Pritchard et al. 1983).

4.121 Involve local coastal zone entities

The Conservation Officer in the Ministry of Natural Resources closely approximates the "local coastal zone entity". The Ministry of Natural Resources is responsible for any land use decision that affects the foreshore or near shore waters. For example, in order to build a hotel with a jetty, the Land Development Control Authority must grant permission to build the hotel and the Ministry of Natural Resources must grant permission to build the jetty (or remove mangroves, or reclaim land, etc.).

While it is fortunate that decisions affecting foreshore and near shore habitats are overseen by Natural Resources personnel, the situation could be improved by requiring the Land Development Control Authority (and the Office of Town and Country Planning below it) to keep a list of environmentally important or sensitive areas to assist the Planning Office in making

environmentally informed decisions. In the case of sea turtles, the list would include significant foraging and nesting areas.

Barbara Lausche (Natural Resources Lawyer, World Wildlife Fund) has been working closely with the BVI Ministry of Natural Resources and the National Parks Trust to develop two new pieces of legislation, the Coastal Conservation Act and the Nature Conservation Act. The project is part of the ongoing Natural Resources Management Project of the Organization of Eastern Caribbean States (OECS) and was undertaken at the request of the government of the BVI.

Part III of the draft Coastal Conservation Act includes "the basic policies and goals that apply to any development or management activities within the Coastal Zone." Part III of this Act, if adopted, would codify existing law principles, such as vesting of the foreshore (mean low water mark to mean high water mark) in the Crown, and reaffirm the public right to use all BVI beaches. Mechanisms to designate certain areas of the foreshore and sea floor as 'special resource areas' or 'special use areas' would be included and the principal regulatory tool, the coastal zone permit, would be provided for. Activities such as sand mining would be strictly regulated with the burden of proof that the activity would not cause environmental damage resting with the applicant. Pollution of the coastal zone would be prohibited. Such legislation is encouraged; it would offer important consolidation in coastal zone management and provide for necessary administrative and enforcement personnel.

4.122 Develop regulatory guidelines

When areas are defined as especially critical to remaining sea turtle stocks, regulatory guidelines will be essential in order to establish a framework within which appropriate land use and development (commercial, recreational, residential) can occur. For instance, development proximal to important nesting beaches should carry the requirement that beach-front lighting be designed in such a way as to prevent the disorientation of hatchlings or nesting adults (see Raymond 1984). Activities such as jetties, seawalls (Section 4.133), sand mining (Section 4.131) and dredging (Section 4.147) would need to be regulated in such a way as to not result in the erosion of terrestrial nesting habitat. Similarly, boaters should be prevented from indiscriminate mooring in reef or sea grass foraging areas (Section 4.147).

4.123 Provide for enforcement of guidelines

Enforcement is important to the perpetuation of any management program. However, any guidelines will have to be formulated with the needs of the community in mind. Ideally, a general acceptance of the guidelines and of the importance of the habitat will result. Civic groups, proximal residents, and frequent commercial users (e.g., fishermen, divers) should be made thoroughly familiar with the management program and be responsible for reporting any violations that occur. In this way, limited enforcement personnel will not have additional burdens placed upon them. This does not lessen the importance, however, of familiarizing enforcement officers with the new guidelines and regulations and making sure that all reports of violations are properly addressed by the appropriate enforcement entity. An enforcement division devoted specifically to environmental law, such as has been established in the USVI would be highly desirable (Section 4.24).

4.124 Develop educational materials

Each management area should have materials developed that explain why it is an important ecological area. Materials can include signs or displays on site, fliers or posters placed in public areas (airports, hotels, government offices), books and pamphlets available from the Ministry of Natural Resources or the National Parks Trust, guided tours or field trips to the area, regular media attention, and public forum slide shows or interpretive programs. Revenue can be generated by offering supervised access to protected areas and developing interpretive programming. The National Parks Trust has several excellent interpretive posters, pamphlets,

books and maps available for areas currently protected. Funding and staff time are major impediments to the development of educational materials.

4.13 Prevent or mitigate degradation of nesting beaches

4.131 Sand mining

Although sand mining is prohibited except by special permit (Section 4.21) and theoretically is prohibited under all circumstances when it is likely to result in shoreline erosion, the fact remains that some beaches in the BVI currently are mined to the extent that huge saline ponds are created in the mining pits. Some of these beaches, including Bluff Bay (Beef Island) and Josiahs Bay, Fat Hogs Bay, Lloyds Beach, and Capoons Bay on Tortola, once were sea turtle nesting areas. Bluff Bay may still support limited nesting, but turtles no longer visit the others.

There is some evidence that mining affects more than just the beach where sand is removed. The excavation at Josiahs Bay may be starving adjacent beaches to the west (Cooten and Carrot) which are now cobble but, according to the older fishermen, were once broad and sandy and regularly visited by leatherback sea turtles. Today, leatherbacks nest on beaches further to the east, e.g., Long Bay, Lampert on Tortola and Long Bay on Beef Island. It is imperative that closer attention be given to the evaluation of permit applications and to the oversight of permitted mining operations. In May of 1967, the miners on Josiahs Bay were brought to court on charges of permit violations, but the case was dismissed on a technicality.

The draft Coastal Conservation Act (Barbara Lausche 1987; Section 4.121) suggests that "all sand mining activities anywhere on the foreshore of the BVI and on any other lands where such mining would make inroads to the sea" be prohibited without exception. Applications for offshore sand mining would have to meet certain environmental conditions and the burden of demonstrating that the environment would not be adversely affected would rest with the applicant.

4.132 Lights

There are some beach areas that are heavily developed (i.e., Cane Garden Pay and Sophie's Bay, Tortola; St. Thomas Bay, Virgin Gorda; Great Harbour, Jest Van Dyke). Although nesting occurs to a greater or lesser degree in each of these areas, there are no records of disorientation of adult turtles or hatchlings. There is a new development planned for Long Bay, Lampert (Tortola) which is one of the few remaining leatherback nesting areas. It is recommended in this case that the architect plan lighting regimes that do not result in beach illumination.

4.133 Beech stabilization structures

It is difficult to say what affect the construction of jetties has had in the BVI with regard to sea turtles; there are few historical data. Jetties are located on the islands of Anegada, Beef (Trellis Bay), Eustatia Frenchman's Cay, Great Camanoe (Low Bay, Lee Bay), Little Thatch, Peter (Sprat Bay), Salt (Salt Island Bay), Tortola and Virgin Gorda (too numerous to list on the latter two islands). In specific instances, jetties are known to have destroyed adjacent beaches (e.g., the Buck Island jetty at the east end of Tortola; Fat Hog's Bay, Tortola), but it is not known to what extent these areas were useful to sea turtles. Coastal erosion resulting from the construction of a solid jetty, combined with near shore dredging, has resulted in over 20 vertical feet of beech loss in recent years at Fat Hogs Bay, East End, Tortola (ECNAMP 1961).

4.134 Beach cleaning equipment

Beach cleaning machinery is not used in the BVI. Some beaches are regularly cleaned by hand rake (e.g., Long Bay, Beef Island; Deadman Bay and White Bay on Peter Island) and personnel should be alerted to watch for signs of sea turtle nesting and report crawls and hatchlings to the Ministry of Natural Resources.

4.135 Beach rebuilding protects

There are no beach rebuilding projects underway in the BVI, but artificial restoration of the dune line at Josiahs Bay and Fat Hogs Bay (Tortola) is planned.

4.14 Prevent or mitigate degradation of marine habitat

4.141 Dynamiting reefs

Koester (1987) reports that the fishermen of Anegada sent a petition to the BVI government (Road Town, Tortola) in 1984 "outlining a series of problems including spear-fishing, dynamiting [Horseshoe] and trap theft." According to the fishermen, the petition has never been acknowledged by the government. I was unable to confirm incidences of dynamiting by talking to fishermen and Fisheries Officers on Tortola. Presumably, this kind of activity is rare; however, it is strongly recommended that the government investigate these charges immediately and take whatever steps are necessary to prevent this potentially devastating environmental destruction from recurring.

4.142 Bleaching reefs

In 1966 a group of fishermen in Anegada reported that foreign fishermen (apparently Puerto Ricans) were bleaching portions of Horseshoe reef (Section 4.111). The offenders, reportedly seeking lobsters, were never identified. The use of bleach (and other chemicals) in marine waters should be prohibited completely.

4.143 Industrial discharges

There is no heavy industry in the BVI, but sewage, phosphorous and anti-fouling paints were identified as potential problems. Sewage from Tortola that is not disposed of in a septic tank is released in 70 feet of water from a pipe that runs along the sea floor at Slaney Point. Here ample current dissipates the effluent and environmental degradation has not been noted. However, domestic septic tanks are often siphoned into collecting trucks which discharge their loads into the mangroves of Paraquita Bay (Tortola). Several people complained of foul smells in this area; some monitoring of the site should be initiated to assess the effect of the effluent on the area. If it is an important nursery for fishes, there is the potential that commercial fishes will be contaminated. Rogers et al. (1982) reports that sewage from Biras Creek (Virgin Gorda) has damaged nearby benthic communities.

Phosphorous effluent from local laundry operations was identified as a possible source of nearshore degradation. Toxic anti-fouling paints are widely used in the yachting/ cruise industry apparently with little disposal oversight.

4.144 At-sea dumping of garbage

Several categories of waste were identified as having been dumped at sea, including pitch (road surfacing), scrap automobiles, oil, gas, bottles, and tires. Items too bulky for the landfill are routinely disposed of off the shelf south of Peter Island (600 m depth). Here (and throughout the Caribbean) sewage, plastics, and other waste is getting to be a serious problem from the yachting/cruise industry. Dumping violations by the boating community will be difficult to monitor and will require a concentrated effort at public education, coupled with convenient places to safely dispose of refuse on shore and stiff penalties for offenders.

4.145 Oil exploration, production, refining, transport

There has been some exploration during this decade (Mobil?) off the north coast of Tortola, and there is talk of offering further contracts. Nothing of significance has yet been discovered.

There is some transport through BVI waters, including both fuel and crude, but no serious problems are reported.

4.146 Agricultural discharges (runoff)

Agriculture is not as important in the BVI as it once was. There is a government research station at Paraquita Bay (Tortola) and there is some chemical runoff associated with the various testing done there. Otherwise, agricultural techniques are traditional and few chemicals are used.

4.147 Others

Mooring, dredging, and land reclamation probably present a much clearer threat to the marine environment in the near future than does industrial or agricultural runoff or oil exploration and transport. Dragline dredging in 1982 in the cove just south of Bitter End Yacht Club (Virgin Gorda) caused extensive damage to the sea grass meadows there (Rogers et al. 1982). Dredging currently proceeding in Trellis Bay (Beef Island) is also causing significant damage to benthic communities. Land "reclamation" is ongoing at several points on the coast of Tortola; the prerequisite filling of mangrove areas with garbage is unsightly and ultimately fatal to these unique and productive ecosystems.

An article in the BVI Beacon newspaper (date?) reports that mini-cruise ships are becoming a topic of hot controversy. The industry began in 1979 and remains "completely unregulated", although the Director of Tourism has said that policies should be ready to implement in 1988. The yachting industry (claiming to represent 70% of the total tourist industry) objects to the freedom of cruise ships to anchor in every bay of the islands. Yachting representatives claim that the anchors and anchor chains of these larger vessels are doing enormous damage to popular reef areas.

The Dive Operators Association (hereafter, the 'Association') is very concerned about this problem. In 1986, there were two mini-cruisers in BVI waters; there were seven in 1987 and there may be fourteen in 1988. Passengers are loaded in Puerto Rico and St. Thomas (USVI) and spend a week anchoring from site to site in the BVI; one Association member likened it to turning the BVI into "a parking lot". Popular dive sites such as "The Settlement" (Salt Island), "The Indians" (Pelican Island) and "Alice in Wonderland" (Ginger Island) already show damaged sea grass beds and shattered coral heads from anchoring. Larger charter yachts like the "Aquanaut Explorer" (live-aboard dive boat, 142-foot) reportedly do similar damage. Sometimes the magnitude of visitation is the problem rather than the size of the vessel. An estimated 17,000 boats anchored in North Sound (Virgin horde) between 1977-1980, causing widespread turbidity and damage to sea grass beds (Salm 1980).

The Association has offered to survey proposed anchoring sites at no charge to the BVI government and to mark specific anchoring sites in such a way as to invite the least environmental damage. The Association is selling T-shirts ("Stop Reef Busting") and donations are being solicited to pay for the placement of permanent moorings. The Association believes that cruise ship companies should be required to contribute the cost of at least one permanent mooring (about US \$50,000) in order to be licensed to operate in BVI waters. The Association has labeled five of the eleven popular cruise-ship anchor sites as "extremely sensitive" and in need of moorings (or strict anchoring regulations) if they are to survive the coming season: "The Settlement", Selt Island; "Great Harbour", Peter Island; "The Byte" and "The Caves", Norman Island; "Great Harbour", Jost Van Dyke.

There is no question that the widespread destruction of reefs and sea grass beds will eventually erode the economic base of the BVI; fisheries and water-based sports will decline. The government of the BVI is in a unique position to have been alerted to the dangers of unregulated mooring while there is still time to develop solutions that will accommodate visiting tourists as well as the local industries they support and the living marine resources (including sea turtles) that they have come to see. Moorings are only one available answer; if chosen, they will require large

initial investments and maintenance commitments. "Adopt a mooring" programs have been successful in some countries where local businesses and civic groups have raised money to establish individual mooring sites.

4.2 Manage and protect all life stages

4.21 Review existing local laws and regulations

The first Ordinance to offer protection to sea turtles was the Turtles Ordinance of 1959. Young and breeding turtles of all species except the leatherback were protected during a closed season extending from 1 July to 31 August. The Ordinance made it an offence to take or possess turtles or turtle eggs (including leatherback eggs) during the closed season, or to take turtles below 20 pounds in weight at any time. The Ordinance established the offender liable to a fine not exceeding \$100 and provided for the confiscation of any turtle products or fishing equipment. Upon conviction, the magistrate could order that a part of any fine imposed not exceeding 50% be paid to any person whose information led to the conviction.

In 1986, the Turtles Ordinance was amended to include the protection of leatherback turtles. In addition, the closed season was extended from 1 April to 30 November. During these eight months, it is unlawful to catch or take any turtle, to slaughter, sell, or possess any turtle or turtle product, or to take the eggs of any turtle species. The remaining restrictions in the 1959 law, namely the size limit and the penalties, stand as before.

All BVI beaches are protected under the Beach Protection Ordinance (1988). This Ordinance prohibits the removal of natural sea barriers or sand, stone, or gravel from the foreshore except through the permission of the Minister (made by application). Under any circumstances, it prohibits removal that is likely to result in shoreline erosion. The Ordinance permits the carrying away of quantities of sand small enough to be removed without an animal or a wheeled vehicle (including wheelbarrows). It prohibits the fouling of the foreshore with garbage or any other debris and establishes penalties for violations.

4.22 Evaluate the effectiveness of law enforcement

Currently, the enforcement of environmental legislation is less than adequate. Officers lack specific training in environmental laws (Section 3.4) and there is a general indifference on the part of the public/judiciary with respect to environmental law enforcement. Enforcement could be made more effective by the active recruiting of information from local residents. Citizen reports are few, yet the Police Commissioner has offered that any citizen wishing to report the violation of a conservation law should contact him directly and he will personally see that it is properly addressed. This kind of attitude is to be applauded, and all citizens are urged to report violations of any sort. Violations against endangered species and habitats erode an irreplaceable national heritage that is unique to the BVI and belongs equally to all her people, present and future.

Current efforts by the Fisheries and Conservation Officers to patrol BVI waters regularly should force a stricter following of fisheries regulations on the part of the public.

4.23 Propose new regulations where needed

4.231 Eggs

The take of eggs should be prohibited at all times. Various estimates of the extent of the harvest exist. Fletemeyer (1981) estimates it close to 50%. Winston Leonard concedes that historically it was probably close to 100% in some areas; the target was primarily hawksbill. The harvest is opportunistic for personal consumption and undoubtedly remains high. Poaching is reported on Long Bay (Beef Island), Cam Bay and North Bay (Great Camanoe), North Beach

(Guana Island), North Bay Beach and the West End beaches of Scrub Island, and all around Anegada. There is no export of eggs.

4.232 Nesting females

The recent extension of the closed season and the protection of leatherback turtles are both great strides forward in the effort to protect marine turtles in the BVI. However, because all three species nest during some part of the open season (December-March, inclusive), the next important step is to bar the take of turtles at all times. It is particularly critical that breeding females be allowed to safely nest. Less than 1% of the hatchlings that enter the sea will survive the many decades required to reach adulthood and survival of these breeders is essential to the survival of a population. Nesting females are the most difficult thing for a population to replace. They should receive the most stringent protection.

4.233 Immatures

The new closed season offers substantially greater protection to foraging juveniles than previously afforded primarily because fishing activity is greatly reduced during the winter months of December-March. However, it is important that foraging juveniles be protected throughout the year. This is the case in the nearby United States Virgin Islands (USVI) and the discrepancies in protection between the two nations cause an endless array of problems for USVI enforcement officers.

First, it is difficult for USVI fishermen to refrain from killing turtles when they know that the turtles are killed as soon as they cross into British waters. Second, the open port on the east end of St. Thomas is an easy entrance point for turtles legally caught in British waters during open season but illegally imported into the USVI. Consequently, USVI enforcement personnel say that the British open season encourages fishermen in the USVI to break the law by illegally smuggling turtles into St. Thomas. Third, BVI fishermen illegally catch turtles in USVI waters and return safely across the border to legally market the turtles in the BVI. These facts point to the fundamental importance of consistency between nations when widely ranging endangered species are involved.

4.234 Unprotected species

All sea turtle species are protected under current Ordinances.

4.24 Augment existing law enforcement efforts

As the situation now stands, the Fisheries, National Parks Trust, Public Health, and Marine Ordinances (as well as the proposed Coastal Conservation Act) all have provisions for their respective Ministers to deputize Officers within the Ministry (or hire enforcement personnel) to enforce the Ordinance. Unfortunately, these options are rarely exercised; consequently, little enforcement outside of the routine enforcement offered by the Police takes place. It was suggested by several parties that a law enforcement division be created to concentrate on environmental law in general so that there is some administrative continuity and the most efficient use of training, time and equipment can be established. In the meantime, Fisheries and Conservation Officers should have full powers of enforcement (only the Fisheries Officer is currently deputized).

Commercial dive operators and fishermen should be encouraged to support formal law enforcement efforts. Both groups are in unique positions to monitor offshore damage to habitat, report out-of-season catches, and exert peer pressure to prevent violations. The owners of residential and commercial beachfront property should also be enlisted to report sea turtles caught (or eggs collected) out of season and any incidences of degradation to the coastal

environment (careless mooring, at-sea-dumping, reef destruction, sand mining, vehicles on nesting beaches).

There have been preliminary discussions with the members of fishing cooperatives in hopes of initiating mechanisms for the regulation of fishermen by fishermen, but commitments are yet to materialize. However, there has been strong support from some local residents, beachfront hotel owners, and dive operators to monitor carefully areas that they use or observe frequently.

4.25 Make fines commensurate with product value

Is the maximum fine for violating the Turtle Ordinance of \$100 and the forfeiture of equipment used (Section 4.21). There is interest within the Ministry of Natural Resources to raise the fine by amending the Ordinance. This will undoubtedly be necessary if it turns out that the newly extended closed season is widely ignored.

4.26 Investigate alternative livelihoods

This is not of great concern to the fishermen of the BVI, for the general consensus is that no one really makes a living from sea turtles. While there is some directed catch (mostly seine nets, some spearing), the majority of turtles landed are brought in incidental to other fishing operations. The "trunk fishery" currently involves a small group of men who still watch the nesting beaches at regular intervals to obtain adult leatherbacks (Section I, 2.3). Fewer than six leatherbacks have been killed per annum over the last decade, reportedly a significant decline from former years (and apparently reflecting a serious decline in nesters). The revenue generated is divided among the trunk fishermen and is not presently a primary source of income.

4.27 Promote the use of the TED or similar methodologies

There is no local or foreign shrimping in the BVI and thus commercial trawling poses no threat to the continued survival of sea turtle stocks. TEDs "Turtle Excluder Devices" or "Trawler Efficiency Devices" as they are sometimes called are not needed. However, long line vessels do unintentionally hook leatherback turtles (Section 2.3) and this situation deserves further study. No mortality has yet been reported.

4.28 Supplement reduced populations using management techniques

There are no data yet to enable personnel within the Ministry of Natural Resources to evaluate the costs and benefits of specific management options. Major foraging and nesting habitats have not been systematically quantified yet. When these areas are identified, it may be sufficient (in conjunction with the elimination of harvest) to simply protect these areas from adverse development. Should the adoption of more elaborate strategies, such as tagging programs or the maintenance of an egg hatchery be deemed desirable, the methodology should follow that described in the Manual of Sea Turtle Research and Conservation Techniques (Pritchard et al., 1983)

4.29 Monitor stocks

4.291 Nests

A program to evaluate and monitor nesting beaches has been initiated by the BVI Ministry of Natural Resources and the National Parks Trust. It is hoped that interested members of the public will volunteer to survey selected beaches and that eventually funds will be available to pay student interns to more closely monitor the success of nests laid on the most important nesting beaches.

It is imperative that nests be monitored on a regular basis so that increasing or decreasing population trends can be documented. Any successful management program must be based on accurate estimates of productivity (the number of nests laid) and mortality (losses due to erosion, feral animals, crabs, birds, mongoose, poachers, etc.).

4.292 Hatchlings

Similarly, it is hoped that volunteers will monitor hatching success on key beaches and report successes and causes of mortality (beach debris, vegetation entanglement, artificial lighting, feral animals, crabs, birds, mongoose. etc.).

4.293 Immatures and adults

The monitoring of juvenile and adult turtles requires special preparation and can be much more difficult than counting nests or evaluating hatchling mortality. In order to monitor foraging juveniles, systematic surveys to specific foraging grounds must be undertaken. If such survey work is undertaken in conjunction with a tagging program, it is possible to evaluate both the foraging periodicities of individuals and their movements (should a tagged turtle turn up at some point distant from where it was tagged, for instance). It is not necessary, however, to tag individuals and valuable information can be garnered by repeated observation of foraging areas and reporting the number of turtles seen.

In order to monitor the number of nesting adult turtles, it is necessary to monitor a beach consistently enough so that one knows exactly how many nests are laid (and by what species) per night. Using this information and the known nesting periodicities of the various species, one can fairly accurately estimate the number of nesting females by the number of nests laid. Systematic morning nest counts are essential for this kind of estimation as is the accurate assessment of whether or not eggs were actually deposited (a turtle sometimes comes ashore and returns to the sea before successfully nesting).

If one wishes to become even more specific about the number of females nesting on a particular beach, as well as the return intervals both within and between seasons by individuals, then trained personnel must undertake all-night patrols and initiate the tagging of nesting females. Tagging is not something to be undertaken lightly. It is time-consuming and can be expensive. Most importantly, one does not learn much about population dynamics from tagging for a year or two. One must be willing to enter into a long-term research commitment (whereby females are consistently tagged for a decade or more) in order to learn anything that is not learned from daily nest counts.

4.3 Encourage and Support International Legislation

4.31 Encourage non-signatories to join CITES

The United Kingdom is party to CITES and the BVI enacted it in legislation as the Endangered Animals and Plants Ordinance of 1976. Any article that does not have proof of legal importation is liable to forfeiture under the Customs Ordinance (1975). The problem is that Customs Officers are not adequately trained to recognize endangered species (or products) and checks do not occur.

4.32 Encourage states to cooperate through other conventions such the Western Hemisphere or Migratory Species Convention

4.33 Establish subgroups in consultation with the IUCN/SSC Marine Turtle Specialist Group

4.34 Encourage states with common stocks of turtles to develop agreements for their management

The USVI and the BVI should be encouraged to protect bilaterally their joint populations of sea turtles (Section 4.233). Inconsistencies between the statutes of the two nations have resulted in considerable enforcement difficulties.

4.35 Ask groups such as IUCN and WWF to provide support and legal expertise to implement above steps

Barbara Lausche (Natural Resources Lawyer, World Wildlife Fund) is assisting the BVI government in drafting a Coastal Conservation Act and a Nature Conservation Act (Section 4.121). These Acts, should they be adopted and will provide an excellent basis for integrating conservation and development in the BVI.

4.4 Develop Public Education

4.41 Local residents

Several excellent environmental awareness programs are available to the local school system through the BVI Ministry of Natural Resources and the National Parks Trust. There is an introductory course in Environmental Awareness available to all elementary schools, and natural resource slide shows are commonly presented to high school students. One such slide program describes mangrove, beach, salt pond, and hill forest ecosystems, and the program is followed by an appropriate field trip. Another slide program specifically discusses sea turtles. These programs currently serve only the island of Tortola and high priority should be placed on expanding them to Virgin Gorda.

In addition to educational programs in the schools, on request personnel from the National Parks Trust lead field trips to National Park sites. Media attention to environmental issues has included newspaper articles (including a regular column in the 'Island Sun'), radio interviews, and films. A locally produced film entitled "Island Web" explains the natural and cultural history of the British Virgin Islands and cautions against over-zealous development. The National Parks Trust distributes a regular newsletter devoted to natural history topics.

While there are no natural history or conservation groups in the BVI, there is certainly potential for such groups as the Botanic Society, Friends of the National Parks Trust, East End/Long Look Action Committee, Historical Society, Lion's Club, Rotary, Dive Operators Association and others to become actively involved in conservation issues. Public meetings (e.g., church and civic group!) are ideal as forums for environmental awareness presentations.

4.42 Tourists

No organized education targeting tourists exists, except that which is offered by popular sites such as the "Wreck of the Rhone". It is imperative that visitors be made more aware of the adverse environmental effects of such activities as indiscriminate mooring, garbage disposal, spear-fishing, and collecting (e.g. corals, sponges, plants). Tourism is a significant source of income for the BVI; it would be ironic if tourists were allowed to destroy the very resources that attracted them to the area in the first place.

Charter operations, divers, and hotel owners should make it a point to have materials available to tourists concerning the legality of such activities as those just cited and to report any violations. Entities such as the BVI Ministry of Natural Resources and the National Parks Trust should provide the necessary materials.

4.43 Fishermen (e.g., preventing incidental catch)

There are no formal education programs for fishermen at the present time, but contact between the Fishermen's Association and the Ministry of Natural Resources is well established and all members of the fishing community are aware of laws protecting sea turtles.

4.44 Non-consumptive use of sea turtles to generate revenue (e.g., natural history expeditions to parks)

A number of Marine Parks and Protected Areas are currently planned in the BVI and some turtle nesting sites are included (e.g., Anegada, Sandy Cay). It is possible that regular sea turtles programs could be initiated in these areas to enable the public, for a fee, to engage in "turtle watching". Proceeds could augment existing funds for park management and interpretive materials.

4.5 Increase Information Exchange

4.51 Marine Turtle Newsletter

4.52 WATS II

4.53 WIDECAST

4.54 Caribbean Newsletter

4.55 Distribute WATS Manual

4.56 Workshops on research end management (after WATS Manual)

4.57 Exchange of information among interested local groups

V. REFERENCES

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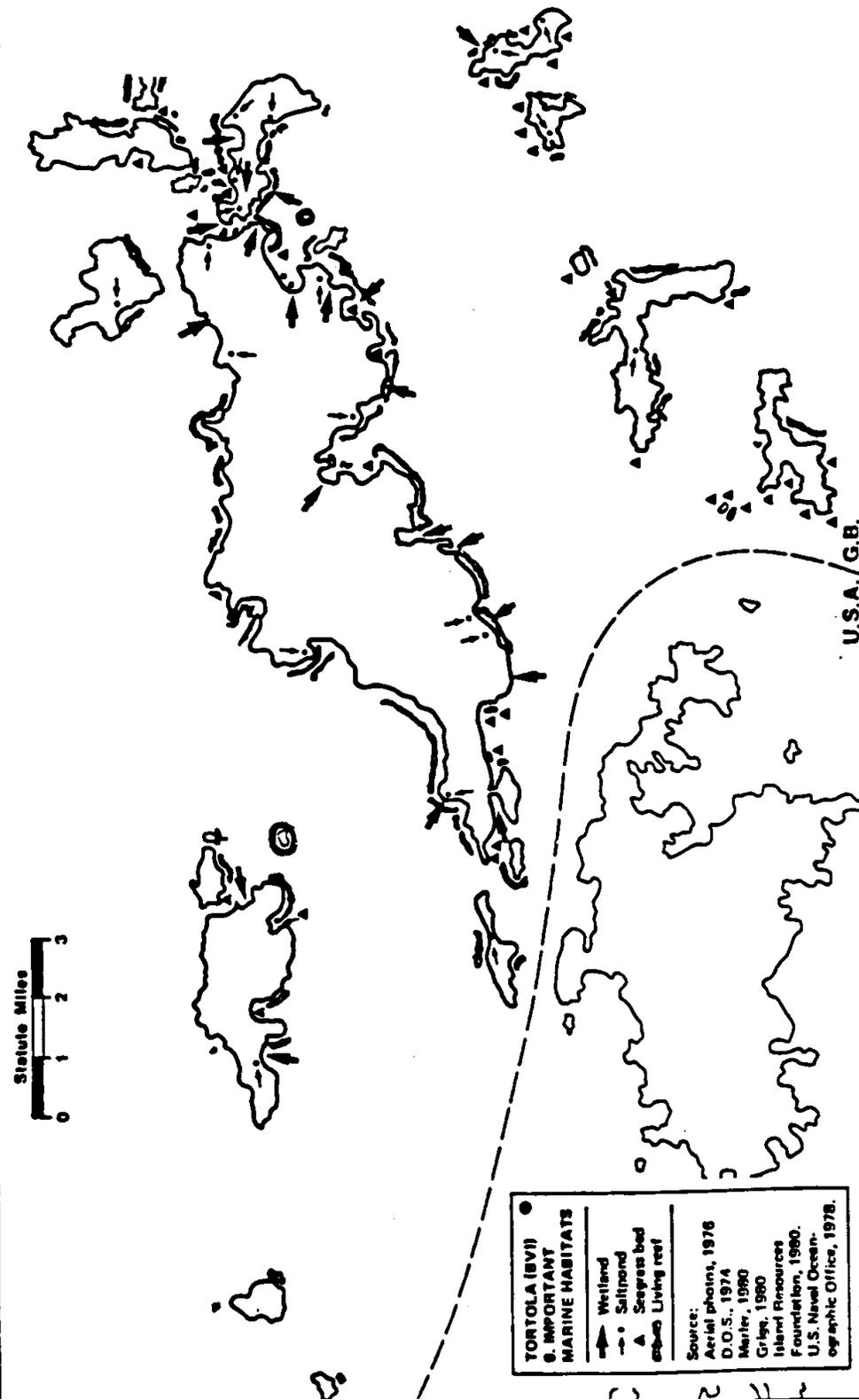
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MAPS

1. Seagrass and reef habitats around Tortola, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles. Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
2. Seagrass and reef habitats around Virgin Gorda, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles. Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
3. Seagrass and reef habitats around Anegade, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles. Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
4. See turtle nesting areas on the island of Tortola, British Virgin Islands. Preliminary Data Atlas. Survey of Conservation Priorities in the Lesser Antilles. Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
5. Sea turtle nesting areas on the island of Virgin Gorda, British Virgin Islands. Preliminary Data Atlas. Survey of Conservation Priorities in the Lesser Antilles. Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
6. Sea turtle nesting areas on the island of Anegada, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles. Eastern Caribbean Natural Areas Management Program (ECNAMP). 1980.

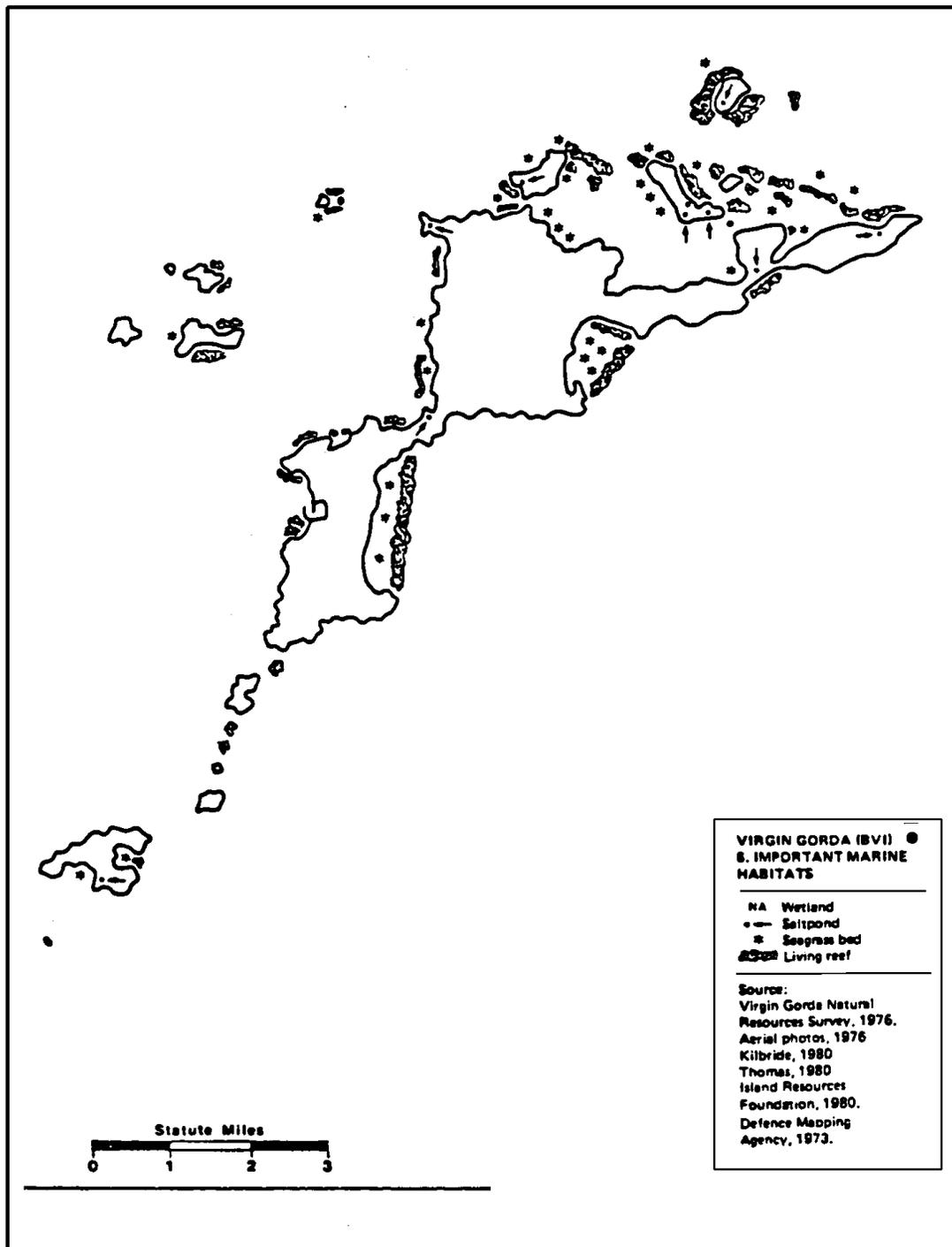
RESOURCE DATA MAPS • TORTOLA (BRITISH VIRGIN ISLANDS)



Map 1. Tortola, British Virgin Islands. Important marine habitats.

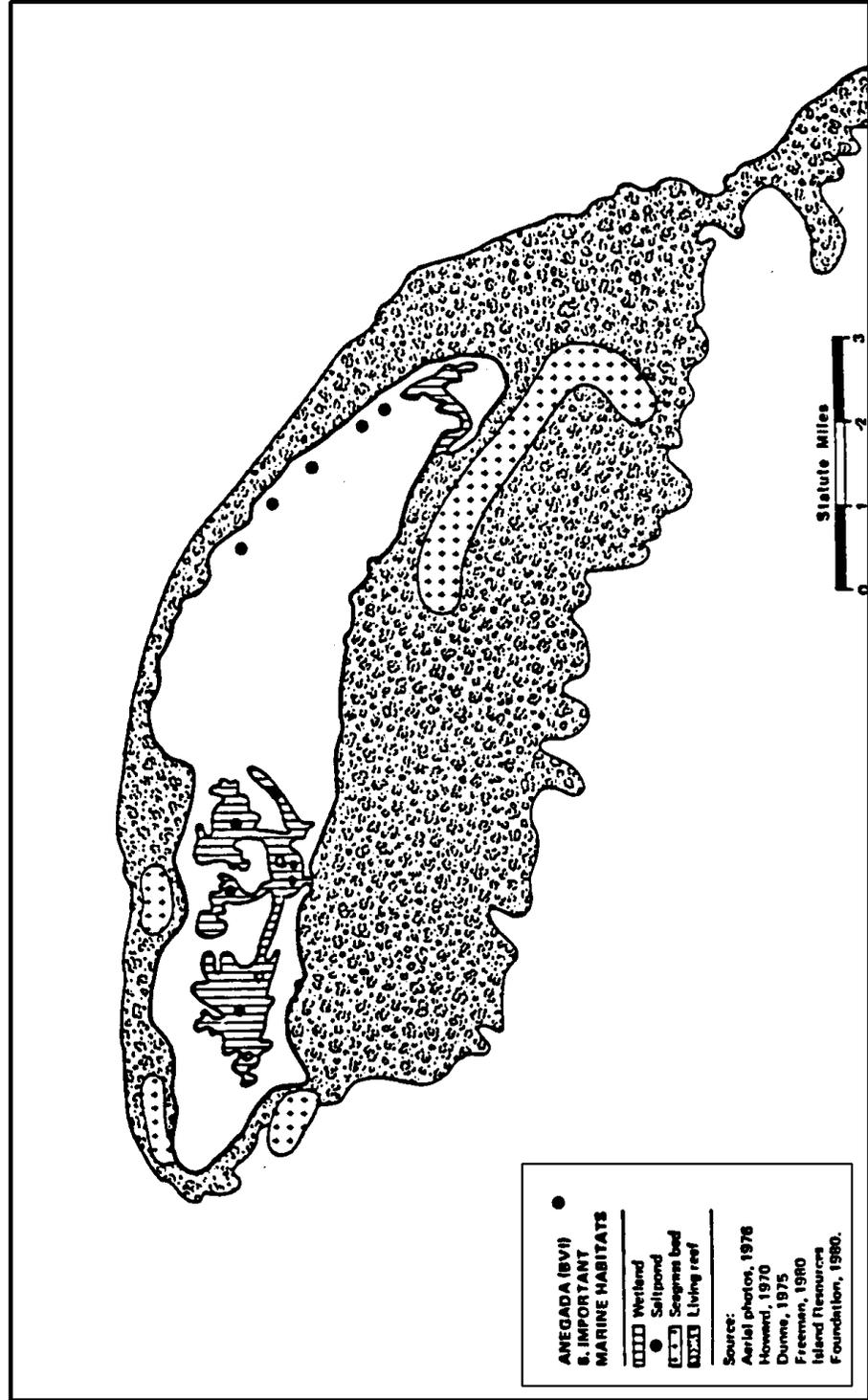
RESOURCE DATA MAPS • VIRGIN GORDA (BRITISH VIRGIN ISLANDS)

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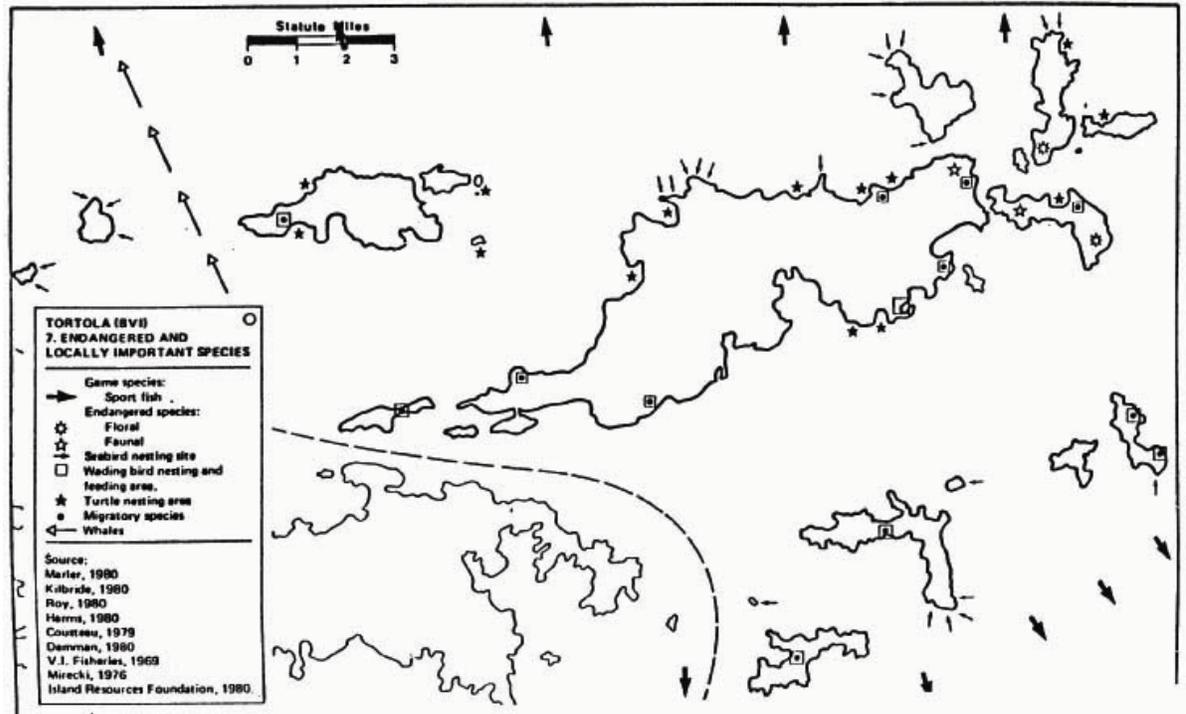
Map 2. Virgin Gorda, British Virgin Islands. Important marine habitats.

RESOURCE DATA MAPS • ANEGADA (BRITISH VIRGIN ISLANDS)



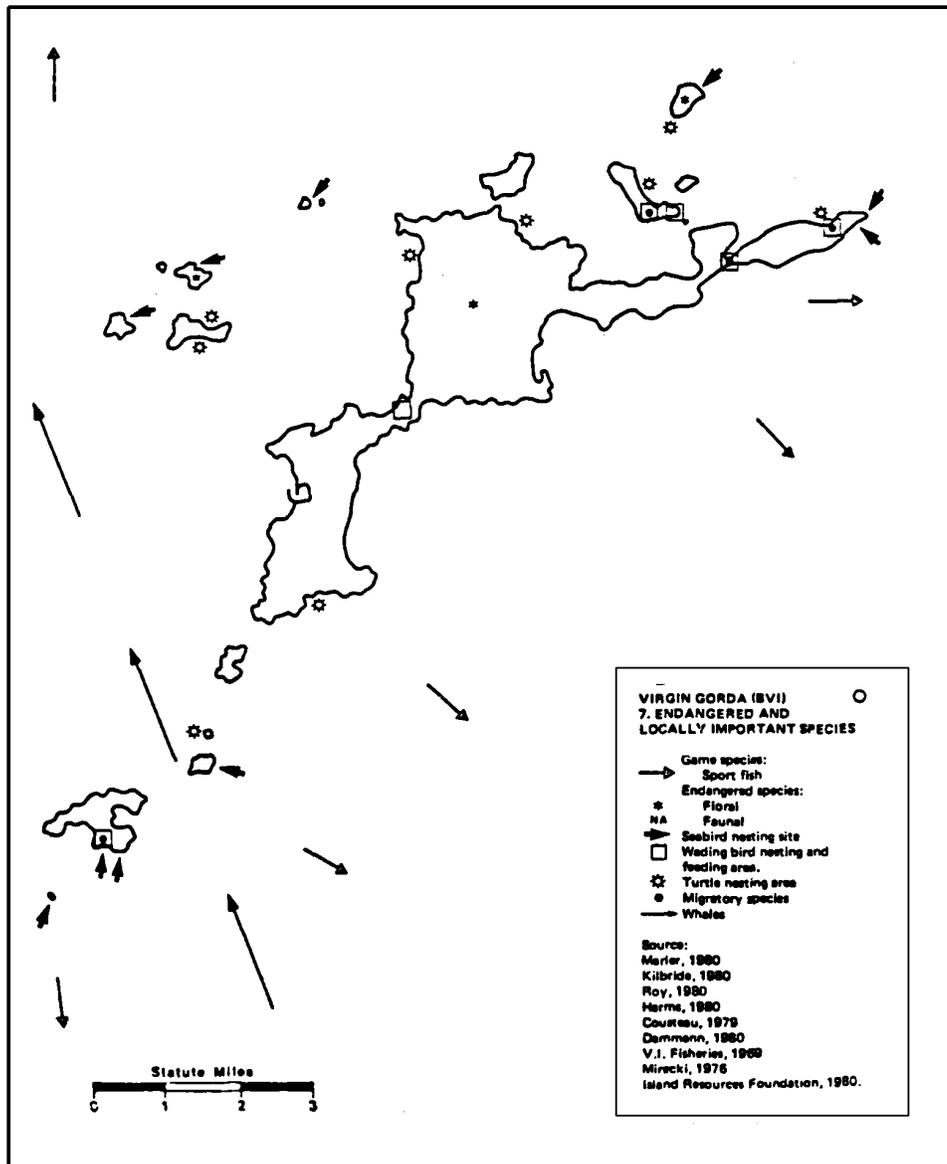
Map 3. Anegada, British Virgin Islands. Important marine habitats.

RESOURCE DATA MAPS • TORTOLA (BRITISH VIRGIN ISLANDS)



Map 4. Tortola, British Virgin Islands

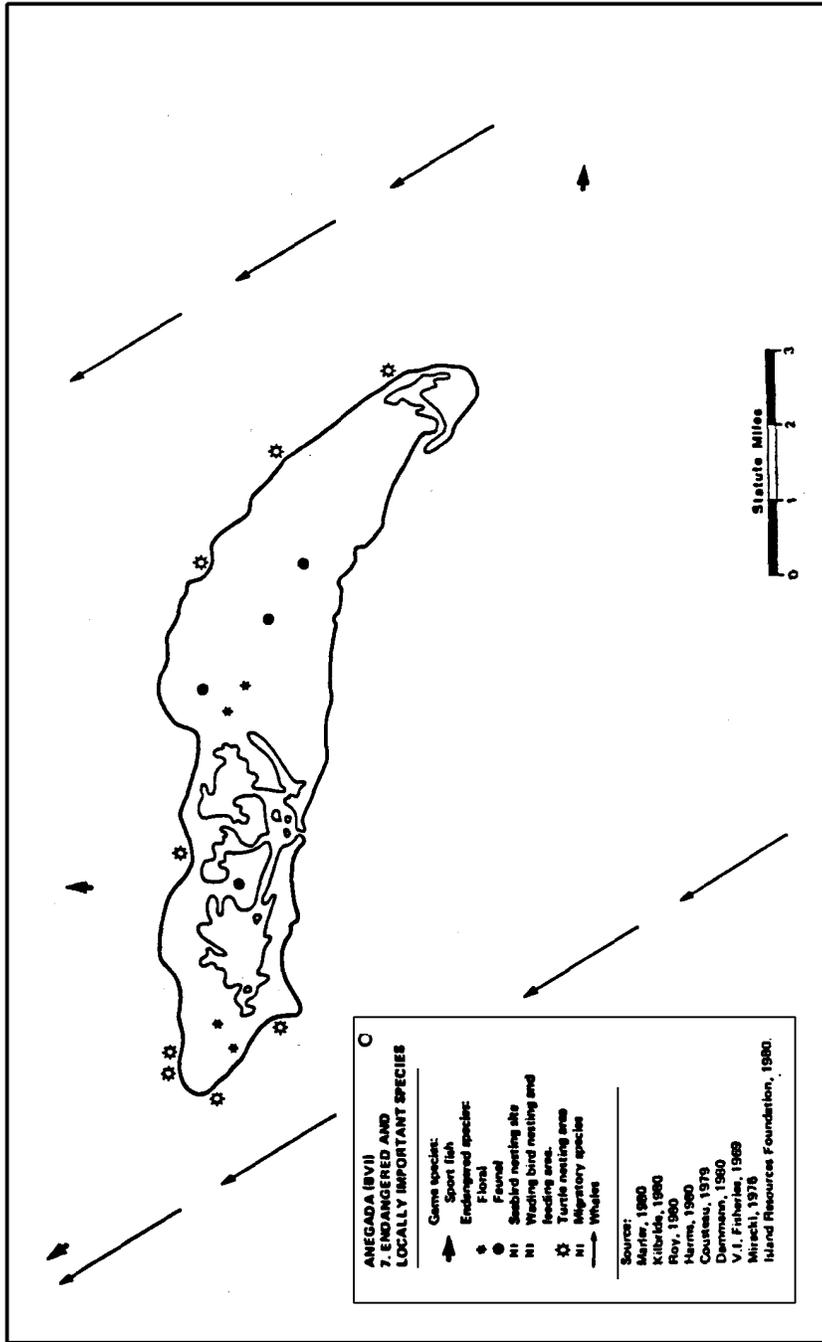
RESOURCE DATA MAPS • VIRGIN GORDA (BRITISH VIRGIN ISLANDS)



Map 5. Virgin Gorda, British Virgin Islands. Seven endangered and locally important sea turtle species.

Eastern Caribbean Natural Area Management Program - Survey of Conservation Priorities in the Lesser Antilles

RESOURCE DATA MAPS • ANEGADA (BRITISH VIRGIN ISLANDS)



Map 6. Anegada, British Virgin Islands. Seven endangered and locally important sea turtle species.

TABLE 1. (*in preparation*)

**Records of green, hawksbill, and leatherback sea turtles
foraging in the waters of the
British Virgin Islands.**

TABLE 2. RECORDS OF GREEN (*CHELONIA MYDAS*), HAWKSBILL (*ERETMOCHELYS IMBRICATA*), AND LEATHERBACK (*DERMOCHELYS CORIACEA*) SEA TURTLES NESTING ON BEACHES IN THE BRITISH VIRGIN ISLANDS, WEST INDIES.

Species abbreviations are Cm, Ei, and Dc, respectively. When a species is listed in parentheses, it is suspected to nest but has not actually been observed. "[Cm/Ei]" indicates that the species in question is definitely not Leatherback. A question mark in parentheses indicates that the species is unknown entirely. "WATS I" = Fletemeyer's (1981) BVI National Report for the Western Atlantic Turtle Symposium, Costa Rica, 1983. "ECNAMP" = Resource Data Maps (specifically, "Endangered and Locally Important Species"), Eastern Caribbean Natural Areas Management Program (1980).

Island: Anegada

Beach	Length	Species	Source
Pomato Point / W. End	3.2	Cm, Ei Dc	WATS I (aerial survey, ECNAMP) Residents
W. End / Cow Wreck	3.4	Ei	WATS I (aerial survey)
Cow Wreck / Windlass	3.5	[Cm/Ei]	WATS I (ECNAMP)
Windlass / Soldier Point	3.0	Cm, Ei	WATS I (fishermen)
Soldier Point / Loblolly Point	3.4	[Cm/Ei]	WATS I (ECNAMP)
Loblolly Point / East Point	6.9	Cm, Ei	WATS I (aerial survey, fishermen, ECNAMP)

Note: Ei along most of the north coast (Winston Leonard)

Island: Beef Island

Beach	Length	Species	Source
Well Bay	0.2	(Cm) Ei	WATS I (fishermen) WATS I (fishermen)
Bluff Bay	---	Ei	B. Lettsome, N. Clarke
Long Bay	0.4	Cm, Ei Ei	WATS I (aerial survey, ECNAMP) M. Doran (hatch report 01/86); T. Davis (hatch report 03/87)
Little (Trellis) Bay	0.5	Dc (Cm) Ei	B. Lettsome WATS I (source unknown) WATS I (aerial survey)

Island: Buck Island

Beach	Length	Species	Source
No beaches suitable for nesting			WATS I
Two beaches (West Beach, North Beach) but no information			B. Lettsome

Island: Cockroach Island

Beach	Length	Species	Source
No beaches suitable for nesting			WATS I

TABLE 2. RECORDS OF GREEN (*CHELONIA MYDAS*), HAWKSBILL (*ERETMOCHELYS IMBRICATA*), AND LEATHERBACK (*DERMOCHELYS CORIACEA*) SEA TURTLES NESTING ON BEACHES IN THE BRITISH VIRGIN ISLANDS, WEST INDIES.

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Island: Cooper Island

Beach	Length	Species	Source
Manchioneel	0.7	(Cm)	WATS I (fishermen)
		(Ei)	WATS I (fishermen)
Coral Bay Beach	---	Ei	W. Leonard
Hallovers Pond Beach	0.9	[Cm/Ei]	WATS I (ECNAMP)

Island: Dead Chest Island

Beach	Length	Species	Source
No beaches suitable for nesting			WATS I

Island: Eustatia

Beach	Length	Species	Source
North End Beach	0.6	?	WATS I (source unknown)

Island: Fallen Jerusalem

Beach	Length	Species	Source
North Lee Bay Beach	0.1	Ei	W. Leonard

Island: Frenchmans Cay

Beach	Length	Species	Source
No beaches suitable for nesting			B. Lettsome

Island: George Dog

Beach	Length	Species	Source
Crabbe Hill Beach	0.2	?	WATS I

TABLE 2. RECORDS OF GREEN (*CHELONIA MYDAS*), HAWKSBILL (*ERETMOCHELYS IMBRICATA*), AND LEATHERBACK (*DERMOCHELYS CORIACEA*) SEA TURTLES NESTING ON BEACHES IN THE BRITISH VIRGIN ISLANDS, WEST INDIES.

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Island: Ginger Island

Beach	Length	Species	Source
South Bay	0.4	?	WATS I
Wedego Bay	0.2	?	WATS I
The Sound Beach	0.3	Ei	W. Leonard

Island: Great Camanoe

Beach	Length	Species	Source
Cam Bay	0.4	[Cm/Ei]	WATS I (fishermen)
Low Bay	0.2	?	WATS I
Lee Bay	0.3	?	WATS I
North Bay	0.4	[Cm/Ei] Ei	ECNAMP B. Lettsome

Island: Great Dog

Beach	Length	Species	Source
North Bay	0.4	[Cm/Ei]	ECNAMP
South Bay	0.5	[Cm/Ei]	ECNAMP

Island: Great Tobago

Beach	Length	Species	Source
Camp Bay	0.1	(Cm) Ei	WATS I (fishermen) WATS I (fishermen)

Island: Great Thatch Island

Beach	Length	Species	Source
The Hallow Beach	0.5	(Cm) Ei	WATS I (source unknown) WATS I (source unknown)

Island: Green Cay

Beach	Length	Species	Source
No beaches suitable for nesting			WATS I

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Island: Guana Island

Beach	Length	Species	Source
White Bay Beach	0.6	[Cm/Ei]	WATS I, residents
Muskmelon Bay Beach	0.5	[Cm/Ei]	WATS I (fishermen)
North Beach	0.9	[Cm/Ei]	residents

Island: Jost Van Dyke

Beach	Length	Species	Source
Saddle Bay	0.2	?	WATS I
White Bay	0.6	Cm	WATS I (aerial survey)
Upper Dog Hole	0.4	?	WATS I
Great Harbour Beach	0.3	[Cm/Ei]	ECNAMP
Garner Bay	0.2	?	WATS I
East End Beach	0.2	?	WATS I
Long Bay	0.6	?	WATS I
North side Bay	0.3	?	WATS I

Island: Little Camanoe

Beach	Length	Species	Source
East End/ South Bay	---	Cm	WATS I (aerial survey)
		(Ei)	WATS I (aerial survey)

Island: Little Jost Van Dyke

Beach	Length	Species	Source
Crawl Beach	---	[Cm/Ei]	B. Lettsome

Island: Little Thatch Island

Beach	Length	Species	Source
Northwest coast	---	Ei	B. Selzer

Island: Little Tobago

Beach	Length	Species	Source
No beaches for nesting			WATS I

TABLE 2. RECORDS OF GREEN (*CHELONIA MYDAS*), HAWKSBILL (*ERETMOCHELYS IMBRICATA*), AND LEATHERBACK (*DERMOCHELYS CORIACEA*) SEA TURTLES NESTING ON BEACHES IN THE BRITISH VIRGIN ISLANDS, WEST INDIES.

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Island: Mosquito Island

Beach	Length	Species	Source
Manchioneel	0.4	[Cm/Ei]	WATS I (fishermen)

Island: Necker Island

Beach	Length	Species	Source
Devil Hill Bay	0.4	[Cm/Ei]	WATS I (fishermen, ECNAMP) Sigma Env. Sci., 1980
West End Beach	---	Cm (Ei)	WATS I (aerial survey) WATS I (aerial survey)

Island: Norman Island

Beach	Length	Species	Source
Buff Bay Beach	0.7	[Cm/Ei]	WATS I (fishermen, ECNAMP)

Island: Pelican Cay

Beach	Length	Species	Source
No beaches suitable for nesting			WATS I

Island: Peter Island

Beach	Length	Species	Source
Little Reef Bay Beach	0.3	? Ei	WATS I (source unknown) B. Lettsome
Big Reef Bay Beach	---	Ei	B. Lettsome
Deadman Bay	0.8	[Cm/Ei] Dc	WATS I (fishermen, divers) Resource magazine (October/December 1985); nester killed
Sprat Bay Beach	0.6	?	WATS I
Rock Hole/ Rogers Point	---	(Ei)	B. Lettsome
West of Key Point	---	(Ei)	B. Lettsome
White Bay Beach	---	(Ei)	B. Lettsome
Sand Pierre Bay	0.6	[Cm/Ei]	ECNAMP
Stoney Bay Beach	0.9	?	WATS I

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Island: Prickly Pear Island

Beach	Length	Species	Source
Opuntia Point/ Asbestos Point	1.6	[Cm/Ei]	WATS I (fishermen, ECNAMP)
Sandy Point Beach (= Prickly Bay Beach)	1.4	[Cm/Ei]	WATS I (fishermen)
Vixen Point Beach	0.9	?	WATS I

Island: Round Rock

Beach	Length	Species	Source
No beaches suitable for nesting			WATS I

Island: Sandy Cay

Beach	Length	Species	Source
Sandy Cay Beach	0.7	Cm, Ei Dc	WATS I (aerial survey) B. Lettsome, N. Clarke

Island: Sandy Spit

Beach	Length	Species	Source
Sandy Spit Beach	0.05	Cm, Ei	WATS I (aerial survey)

Island: Salt Island

Beach	Length	Species	Source
South Bay Beach	0.3	?	WATS I
Salt Island Bay	0.2	?	WATS I
Sound Beach	0.3	Ei	W. Leonard

Island: Scrub Island

Beach	Length	Species	Source
East South Bay	0.2	?	WATS I
North Bay Beach	0.3	[Cm/Ei]	ECNAMP
West End Beaches	---	Ei	W. Robinson
Location unknown	---	Ei	WATS I (aerial survey)

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Island: Seal Dog Islands

Beach	Length	Species	Source
No beaches suitable for nesting			WATS I

Island: Tortola

Beach	Length	Species	Source
Sandy Point Beach	0.2	?	WATS I
Sea Cow Bay Beach	0.6	?	WATS I
Sophie Bay Beach	---	[Cm/Ei] Cm	ECNAMP G. Blok (hatch 06/84). L. Blok (adults nesting)
Brandywine Beach	0.6	[Cm/Ei] Ei	WATS I (fishermen, ECNAMP) B. Lettsome
Halfmoon Bay Beach	0.8	[Cm/Ei]	Residents
Hodges Bay Beach (= Money Bay/ Bar Bay)	0.8	[Cm/Ei]	WATS I (fishermen), B. Lettsome
Fat Hogs Bay	---	Dc	Fishermen (nester killed, 1982)
Lloyds Beach (= Hawk's Nest)	---	Ei	B. Lettsome
Little Bay, Lampert	0.5	Cm Dc, Ei	WATS I (aerial survey) WATS I (source unknown)
Long Bay, Lampert	1.4	Cm, Ei Dc	WATS I (ECNAMP) B. Lettsome/ N. Clarke (crawls 04/87, 05/87); nester killed 05/86
Josiahs Bay beach	0.9	Cm, Ei Dc	WATS I (ECNAMP) B. Lettsome; Dr. K. Pickering (04/87, 06/87)
Roques Beach	---	Dc	B. Lettsome/ N. Clarke (2 crawls 05/87)
Trunk Bay Beach	0.8	Dc	B. Lettsome/ N. Clarke (crawls 04/87, 05/87)
Cooper Bay Beach	0.7	[Cm/Ei]	WATS I (fishermen)
Larmer's Bay Beach	1.2	Cm, Ei	WATS I
Brewer's Bay Beach	---	Ei	N. Clarke (hatch report 01/86)
Cane Garden Bay Beach	1.8	[Cm/Ei]	WATS I (ECNAMP)
Capoons Beach	---	[Cm/Ei]	B. Lettsome
Long Bay/ Belmont Bay	2.2	?	WATS I
Smuggler's Cove Beach	---	Cm, Ei	C. Arneboro

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Island: Virgin Gorda

Beach	Length	Species	Source
St. Thomas Bay	1.3	Cm, Ei	WATS I (aerial survey)
Savannah Bay	1.1	?	WATS I
Tetor/ Mt. Trunk Bay	1.0	Dc	WATS I (fishermen)
Biras Hill Beach	0.3	?	WATS I
Crooks Bay Beach	1.1	[Cm/Ei]	ECNAMP
Long Bay/ Mt. Point	---	[Cm/Ei]	ECNAMP
Little Trunk Bay	---	[Cm/Ei]	ECNAMP
Oil Nut Bay	---	[Cm/Ei]	ECNAMP

Island: West Dog Island

Beach	Length	Species	Source
No beaches suitable for nesting			WATS I

QUESTIONNAIRE

Caribbean Trade In Sea Turtle Products

The Wider Caribbean Sea Turtle Conservation Network (WIDECAST) urgently requests your involvement in a fact finding mission. The biennial meeting of Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) will take place in Ottawa, Canada, 12-25 July 1987. Delegates representing nations from around the world will be asked to make decisions on the acceptability of proposals for international trade in sea turtle products, relative to the endangered status of the sea turtles involved. Those same delegates need to hear from you. The Caribbean community must be heard on matters of international trade in endangered species that are essential to the Caribbean way of life.

The enclosed questionnaire deals with Caribbean trade in sea turtle products. Your comments will be used by the Director General of WIDECAST to prepare an informational document for CITES delegates. The document will provide an analysis of existing Caribbean trade in sea turtle products, based on the best data available in time for the CITES meeting. It will also present the range of opinions expressed by you, the participants of the WIDECAST network, and by other concerned individuals on a variety of topics dealing with trade and conservation of sea turtles.

The completed document on Caribbean trade in sea turtle products will be made available to all CITES delegates by April, well before the July meeting in Ottawa. All who have participated in the preparation of the document by completing the enclosed questionnaire will also receive a copy, but your comments should be received not later than February 20, 1987 to ensure that you are included in the final draft. WIDECAST would like to append to the completed document a list of contributors and addresses in order to stimulate the exchange of views and information among the participants of the WIDECAST network. However, should you request anonymity for your answers or your participation in the preparation of the document, your wishes will be strictly honored. Please indicate your preference at the bottom of this page.

Name: Bertrand Lettsome

Mailing Address: Conservation Officer, Ministry of Natural Resources, Road Town, Tortola, British Virgin Islands

Profession: Marine Biologist

Phone: 809-494-3701 or 43904

Country for which you are supplying information: British Virgin Islands

If you are providing Information for a particular area or district within a country and not the entire country, please denote the area to which your Information pertains:

I request that my participation in this questionnaire remain anonymous _____

I request that my answers in this questionnaire remain confidential _____

Please air mail completed questionnaires to: Dr. James I. Richardson
Director General WIDECAST
Institute of Ecology
University of Georgia
Athens, Georgia 30602 USA

MARKET SURVEY

There is an active legal commerce in sea turtle products within much of the Wider Caribbean and throughout the world. Many individuals and governments believe that national and international commerce in sea turtles must be strictly regulated before dwindling turtle populations can recover. A detailed accounting of national and international trade in sea turtle products must be made available to all governments if cooperative programs for the recovery and management of sea turtle populations are to be realized. This MARKET SURVEY is designed to gather general information for 1987 CITES delegates. The information you provide is very important to the overall success of the survey.

RAW HAWKSBILL TORTOISE SHELL (Unprocessed)

Also called hawksbill shell, hawksbill scales, bekko
Eretmochelys imbricata (Ei): hawksbill, carey, caret, oxbill

1. Is raw hawksbill tortoiseshell harvested legally within your country?

Yes X No _____ Not sure _____

If YES, please complete questions a through d.

- a) Most of the hawksbills are taken by: (Please circle answer)

Commercial sea turtle fishermen

Always Sometimes Rarely Never

Commercial fishermen who take sea turtles incidental to other fishing activities

Always Sometimes Rarely Never

Recreational divers

Always Sometimes Rarely Never

People who patrol beaches to capture nesting female sea turtles

Always Sometimes Rarely Never

Young people looking for spending money

Always Sometimes Rarely Never

Other (please specify) _____

Always Sometimes Rarely Never

b) Can you estimate the number of individual hawksbill turtles harvested or the amount (weight) of raw hawksbill tortoiseshell collected within your country each year?

Number of Animals

Amount of Tortoiseshell

1-10

1-10 kilos

10-100

10-100 kilos

100-1,000

100-1,000 kilos

more than 1,000

more than 1,000 kilos

c) Do the same people who capture hawksbills also:

I. Manufacture tortoiseshell products to sell?

Yes _____ No **X** Not sure _____

II. Export raw tortoiseshell to other countries?

Yes _____ No **X** Not sure _____

III. Sell tortoiseshell to other individuals or companies within your country?

Yes **X** No _____ Not sure _____

d) Can you estimate the price in local currency for:

An individual hawksbill turtle US \$1.75 per pound

A kilo of raw tortoiseshell _____

2. Is hawksbill tortoiseshell imported into your country?

Yes _____ No **X** Not sure _____

If YES, please complete questions a through c.

a) The individuals importing most of the raw hawksbill tortoiseshell into your country are:

Foreign dealers

Always Sometimes Rarely Never

Local buyers

Always Sometimes Rarely Never

Local fishermen returning from foreign waters

Always Sometimes Rarely Never

Foreign fishermen

Always Sometimes Rarely Never

Other individuals (please specify) _____

Always Sometimes Rarely Never

b) From which countries do you think most of the imported hawksbill tortoiseshell is coming?

c) Can you estimate the quantity (weight) of raw tortoiseshell or the numbers of hawksbill carapaces which are imported each year?

<u>Number of Animals</u>	<u>Amount of Tortoiseshell</u>
1-10	1-10 kilos
10-100	10-100 kilos
100-1,000	100-1,000 kilos
more than 1,000	more than 1,000 kilos

3. Is hawksbill tortoiseshell commercially exported to other countries?

Yes _____ No **X** Unknown _____

If YES, please complete questions a through d.

a) The individuals exporting most of your hawksbill shell to other countries are:

Foreign dealers

Always Sometimes Rarely Never

Local buyers

Always Sometimes Rarely Never

Foreign fishermen departing your territorial waters with locally caught turtles

Always Sometimes Rarely Never

Local fishermen taking locally caught turtles for sale in other countries

Always Sometimes Rarely Never

Other individuals (please specify)

Always Sometimes Rarely Never

b) To which countries do you think your hawksbill tortoiseshell is being exported?

c) From which countries do the foreign buyers come?

d) Can you estimate the quantity (weight) of tortoiseshell or the numbers of hawksbill carapaces which are exported each year?

<u>Number of Animals</u>	<u>Amount of Tortoiseshell</u>
1-10	1-10 kilos
10-100	10-100 kilos
100-1,000	100-1,000 kilos
more than 1,000	more than 1,000 kilos

MARKET SURVEY

Species: *Eretmochelys imbricata* (Ei); hawksbill, carey, caret, oxbill

Please check appropriate line:
Yes; No; Unsure (Un)

Please respond by placing the appropriate number in each space: (1) Always; (2) Sometimes; (3) Rarely; (4) Never

Market Item	Manufactured in Country	Foreign Imports	Exports	Where Sold Locally *	Type of Store	Buyer *
Carapace wall hanging	Yes <u>X</u>	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident <u>2</u>
	No _____	_____	_____	Small cities <u>X</u>	Airport <u>2</u>	Foreign tourist <u>2</u>
	Unsure _____	No <u>X</u>	No <u>X</u>	Rural areas <u>X</u>	Gift <u>2</u>	National tourist _____
		Unsure _____	Unsure _____		Department _____	
				St. vendor _____		
				Marketplace _____		
Stuffed whole turtles or mounted heads	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No <u>X</u>	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
				St. vendor _____		
				Marketplace _____		
Sea turtle creams, lotions, cosmetics, medicines	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No <u>X</u>	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
				St. vendor _____		
				Marketplace _____		
Raw or frozen sea turtle meat	Yes <u>X</u>	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local restaurant <u>X</u>
	No _____	_____	_____	Small cities <u>X</u>	Airport _____	Foreign tourist _____
	Unsure _____	No <u>X</u>	No <u>X</u>	Rural areas <u>X</u>	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
				St. vendor _____		
				Marketplace _____		
Canned sea turtle food products	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No <u>X</u>	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
				St. vendor _____		
				Marketplace _____		
Sea turtle eggs (distributed among family and friends)	Yes <u>X</u>	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident <u>X</u>
	No _____	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No <u>X</u>	No <u>X</u>	Rural areas <u>X</u>	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
				St. vendor _____		
				Marketplace _____		
Other products (define)	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No _____	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
				St. vendor _____		
				Marketplace _____		

MARKET SURVEY

Species: *Chelonia mydas* (Cm); green turtle, tortuga verde, tortue verte, greenback turtle

Please check appropriate line:
Yes; No; Unsure (Un)

Please respond by placing the appropriate number in each space: (1) Always; (2) Sometimes; (3) Rarely; (4) Never

Market Item	Manufactured in Country	Foreign Imports	Exports	Where Sold Locally *	Type of Store	Buyer *
Carapace wall hanging	Yes <input checked="" type="checkbox"/>	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident <input checked="" type="checkbox"/>
	No _____	_____	_____	Small cities <input checked="" type="checkbox"/>	Airport <input checked="" type="checkbox"/>	Foreign tourist <input checked="" type="checkbox"/>
	Unsure _____	No <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>	Rural areas <input checked="" type="checkbox"/>	Gift <input checked="" type="checkbox"/>	National tourist _____
		Unsure _____	Unsure _____		Department _____	
					St. vendor _____	
					Marketplace _____	
Stuffed whole turtles or mounted heads	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No <input checked="" type="checkbox"/>	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
					St. vendor _____	
					Marketplace _____	
Sea turtle skins (raw) or finished leather	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No <input checked="" type="checkbox"/>	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
					St. vendor _____	
					Marketplace _____	
Sea turtle creams, lotions, cosmetics, medicines	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No <input checked="" type="checkbox"/>	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
					St. vendor _____	
					Marketplace _____	
Raw or frozen sea turtle meat	Yes <input checked="" type="checkbox"/>	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident <input checked="" type="checkbox"/>
	No _____	_____	_____	Small cities <input checked="" type="checkbox"/>	Airport _____	Foreign tourist _____
	Unsure _____	No <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
					St. vendor _____	
					Marketplace _____	
Canned sea turtle food products	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No <input checked="" type="checkbox"/>	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
					St. vendor _____	
					Marketplace _____	
Sea turtle eggs	Yes <input checked="" type="checkbox"/>	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident <input checked="" type="checkbox"/>
	No _____	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>	Rural areas <input checked="" type="checkbox"/>	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
					St. vendor _____	
					Marketplace _____	
Other products (define)	Yes _____	Yes, from _____	Yes, to _____	Major cities _____	Hotel _____	Local resident _____
	No <input checked="" type="checkbox"/>	_____	_____	Small cities _____	Airport _____	Foreign tourist _____
	Unsure _____	No _____	No _____	Rural areas _____	Gift _____	National tourist _____
		Unsure _____	Unsure _____		Department _____	
					St. vendor _____	
					Marketplace _____	

* Please be sure to fill in all spaces

MARKET SURVEY

Species: *Dermochelys coriacea* (Dc); leatherback, tinglada, turtue luth, trunkback

Please check appropriate line:
Yes; No; Unsure (Un)

Please respond by placing the appropriate number in each space: (1) Always; (2) Sometimes; (3) Rarely; (4) Never

Market Item	Manufactured in Country	Foreign Imports	Exports	Where Sold Locally *	Type of Store	Buyer *
Carapace wall hanging	Yes ___	Yes, from ___	Yes, to ___	Major cities ___	Hotel ___	Local resident ___
	No <u>X</u>	___	___	Small cities ___	Airport ___	Foreign tourist ___
	Unsure ___	No <u>X</u>	No <u>X</u>	Rural areas ___	Gift ___	National tourist ___
		Unsure ___	Unsure ___		Department ___	
				St. vendor ___		
				Marketplace ___		
Stuffed whole turtles or mounted heads	Yes ___	Yes, from ___	Yes, to ___	Major cities ___	Hotel ___	Local resident ___
	No <u>X</u>	___	___	Small cities ___	Airport ___	Foreign tourist ___
	Unsure ___	No ___	No ___	Rural areas ___	Gift ___	National tourist ___
		Unsure ___	Unsure ___		Department ___	
				St. vendor ___		
				Marketplace ___		
Sea turtle skins (raw) or finished leather	Yes ___	Yes, from ___	Yes, to ___	Major cities ___	Hotel ___	Local resident ___
	No <u>X</u>	___	___	Small cities ___	Airport ___	Foreign tourist ___
	Unsure ___	No ___	No ___	Rural areas ___	Gift ___	National tourist ___
		Unsure ___	Unsure ___		Department ___	
				St. vendor ___		
				Marketplace ___		
Sea turtle creams, lotions, cosmetics, <u>medicines</u>	Yes <u>X</u>	Yes, from ___	Yes, to ___	Major cities ___	Hotel ___	Local resident <u>X</u>
	No ___	___	___	Small cities ___	Airport ___	Foreign tourist ___
	Unsure ___	No <u>X</u>	No <u>X</u>	Rural areas <u>X</u>	Gift ___	National tourist ___
		Unsure ___	Unsure ___		Department ___	
				St. vendor ___		
				Marketplace ___		
Raw or frozen sea turtle meat	Yes <u>X</u>	Yes, from ___	Yes, to ___	Major cities ___	Hotel ___	Local resident <u>X</u>
	No ___	___	___	Small cities ___	Airport ___	Foreign tourist ___
	Unsure ___	No <u>X</u>	No <u>X</u>	Rural areas <u>X</u>	Gift ___	National tourist ___
		Unsure ___	Unsure ___		Department ___	
				St. vendor ___		
				Marketplace ___		
Canned sea turtle food products	Yes ___	Yes, from ___	Yes, to ___	Major cities ___	Hotel ___	Local resident ___
	No <u>X</u>	___	___	Small cities ___	Airport ___	Foreign tourist ___
	Unsure ___	No ___	No ___	Rural areas ___	Gift ___	National tourist ___
		Unsure ___	Unsure ___		Department ___	
				St. vendor ___		
				Marketplace ___		
Sea turtle eggs	Yes <u>X</u>	Yes, from ___	Yes, to ___	Major cities ___	Hotel ___	Local resident <u>X</u>
	No ___	___	___	Small cities ___	Airport ___	Foreign tourist ___
	Unsure ___	No <u>X</u>	No <u>X</u>	Rural areas <u>X</u>	Gift ___	National tourist ___
		Unsure ___	Unsure ___		Department ___	
				St. vendor ___		
				Marketplace ___		
Other products (define)	Yes ___	Yes, from ___	Yes, to ___	Major cities ___	Hotel ___	Local resident ___
	No <u>X</u>	___	___	Small cities ___	Airport ___	Foreign tourist ___
	Unsure ___	No ___	No ___	Rural areas ___	Gift ___	National tourist ___
		Unsure ___	Unsure ___		Department ___	
				St. vendor ___		
				Marketplace ___		

* Please be sure to fill in all spaces

6. How many turtles of all sizes do you think are being harvested in your territorial waters each year by divers with spear guns?

<u>Harvested per year</u>	<u>Hawksbill</u>	<u>Green</u>	<u>Leatherback</u>
None			X
1-10	X	X	
10-100			
100-1,000			
More than 1,000			

7. How many turtles of all sizes do you think are being harvested in your territorial waters each year by boatmen with harpoons?

<u>Harvested per year</u>	<u>Hawksbill</u>	<u>Green</u>	<u>Leatherback</u>
None	X	X	X
1-10			
10-100			
100-1,000			
More than 1,000			

8. How many turtles of all sizes do you think are being harvested in your territorial waters each year by methods not covered by questions 5, 6, and 7? Please specify the harvest methods being considered.

Jumping on back of surfacing turtle from boat.

<u>Harvested per year</u>	<u>Hawksbill</u>	<u>Green</u>	<u>Leatherback</u>
None		X	X
1-10	X		
10-100			
100-1,000			
More than 1,000			

ILLEGAL TRADE

Governments must maintain control over their natural resources. They must be able to assess population numbers and establish permissible take within their national waters. They must establish their authority and responsibility within the international community and be active participants in wildlife treaties such as CITES and the Cartagena Convention. Illegal commerce in wildlife, fisheries, and other natural resource products frustrates the role of government as the authority for its citizens. WIDECAST would like your opinion of the magnitude of illegal trade in sea turtles and their products in the Wider Caribbean. The continuing presence of such illegal trade blocks attempts by Wider Caribbean nations to initiate national and international programs to recover and manage depleted sea turtle populations. (Please circle the appropriate answer).

1. Are sea turtles being taken illegally out of season?

Always Sometimes Rarely Never

2. Are sea turtle eggs being taken illegally out of season?

Always Sometimes Rarely Never

3. Are illegal size classes of sea turtles being taken during the legal season?

Always Sometimes Rarely Never

4. Are commercial wholesale buyers purchasing sea turtle carapaces, shell, leather, or other products from your citizens and transporting these products illegally out of your country?

Always Sometimes Rarely Never

a) Can you estimate how many buyers are involved?

b) To which countries are the illegal sea turtle products being taken?

c) Do you think the fishermen know that their actions are illegal when they sell to the buyers?

Always Sometimes Rarely Never

5. Are foreign tourists taking purchased sea turtle products illegally out of the country?

Always Sometimes Rarely Never

6. A wide variety of individuals and professionals may be responsible collectively for illegal harvest of sea turtles and their eggs. The burden of responsibility must not be placed unfairly on a single segment of the human population if others are also involved. Please indicate how important you think each group is for overall illegal harvest of sea turtles in your country. For each question below, please circle the importance level.

a) Foreign tourists who take sea turtles with spear guns
Not important Very important

0 2 4 6 8 10

b) Foreign fishermen in your territorial waters
Not important Very important

0 2 4 6 8 10

c) Local commercial sea turtle fishermen
Not important Very important

0 2 4 6 8 10

d) Local commercial fishermen who take sea turtles incidental to other fishing activities
Not important Very important

0 2 4 6 8 10

e) Local citizens who hunt turtles for personal consumption
Not important Very important

0 2 4 6 8 10

f) Local citizens who patrol beaches for sea turtle eggs for sale or personal use
Not important Very important

0 2 4 6 8 10

g) Local citizens who discover unexpectedly a sea turtle or its eggs while they are involved in other activities such as swimming or diving for recreation or while walking the beach for pleasure
Not important Very important

0 2 4 6 8 10

h) Young kids looking for a way to make a little money
Not important Very important

0 2 4 6 8 10

7. Are these items manufactured within the country?

Yes X No _____ Not sure _____

If YES, by whom? Local craft persons

8. Are tortoiseshell products imported into your country for sale?

Always Sometimes Rarely Never

If YES, from which countries do these products come? Cayman Islands

9. Are tortoiseshell products commercially exported for sale in other countries?

Always Sometimes Rarely Never

If YES, to which countries do most of these products go?

10. Can you estimate quantity sold or the value of these sales? (Specify currency)

11. Do you think the majority of the import and export trade in tortoiseshell products in your country is handled by: (Please circle answer)

Local professional traders Never	Primarily	Sometimes	<u>Rarely</u>
Foreign professional traders Never	Primarily	Sometimes	Rarely
Local store owners Never	Primarily	<u>Sometimes</u>	Rarely
Artisan cooperatives Never	Primarily	Sometimes	Rarely
An occasional foreign buyer Never	Primarily	<u>Sometimes</u>	Rarely
An occasional local buyer Never	Primarily	Sometimes	Rarely
Other _____ Never	Primarily	Sometimes	Rarely

12. Which species are used? (Please circle answers)

Hawksbill Green Other _____ Not sure

STOCK ASSESSMENT

The Western Atlantic Turtle Symposium (WATS I) at San Jose, Costa Rica, in September of 1983 marked the first time that 39 governments of the Wider Caribbean had come together to discuss the status of sea turtle populations in the region. The priority task of the meeting was stock assessment; how many animals were present and how were these numbers changing with time? It was the nearly unanimous opinion of the parties to the WATS I meeting that current sea turtle population numbers were well below historical numbers and probably continuing to decline in most areas of the Caribbean. National surveys are being updated now in preparation for the next WATS II meeting scheduled for Mayaguez, Puerto Rico, in October 1987.

WIDECASST would like your opinion on some stock assessment questions that will help us assist with the WATS II effort as well as provide information for the upcoming CITES meeting. We know that absolute numbers are not available for most stock assessment questions, but "best guess" educated opinions can be very valuable for identifying problem areas where further on-site investigations may be needed.

1. How many clutches of eggs are currently laid per year in your country? (Please check the appropriate space for each species of sea turtle.).

<u>Clutches per year</u>	<u>Hawksbill</u>	<u>Green</u>	<u>Leatherback</u>
None			
10-100		X	X
100-1,000			
1,000-10,000	X		
More than 10,000			

2. What proportion of all nests do you think hatch successfully? (Please check the appropriate space for each species of sea turtle.)

	<u>Almost none</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>Almost all</u>
Hawksbill			X		
Green			X		
Leatherback		X			

BRITISH VIRGIN ISLANDS NATIONAL REPORT

WESTERN ATLANTIC TURTLE SYMPOSIUM II

12-16 OCTOBER 1987

MAYAGÜEZ, PUERTO RICO

**National Report presented by
Karen Lind Eckert
Wider Caribbean Sea Turtle Recovery Team (WIDECAST)
(Acting as BVI National Representative)**

Bertrand Lettsome, Conservation Officer for the Ministry of Natural Resources and Labour, regrets that he was not able to attend the Symposium. He and I have worked together during the past two years to evaluate the status of sea turtles in the BVI; I am pleased to offer you the statement that he has prepared for this meeting.

The British Virgin Islands are similar to other West Indian nations in that marine turtles have played an important role in cultural and socioeconomic development. Although there has never been an established commercial export of turtles, the three species that exist locally, the Hawksbill, Green and Leatherback, have been extensively exploited at the subsistence level. The local turtle fishery has been family or community oriented and, although there has been a significant decline in the fishery, the trend of community consumption continues today. Green and Hawksbill turtles are captured in nets; Leatherbacks are captured when they come ashore to nest.

Historically, the Leatherback or Trunk fishery was never as important economically as the Hawksbill/ Green fishery because of its seasonal nature (taking place only during the nesting months, March-June). In addition, there was not a large market for the primary product derived from the animal, which was oil. What this fishery lacked in economic importance, however, it made up for culturally. "Trunking" is deeply rooted in tradition and mysticism. Some fishermen trace the roots of the fishery back to the days of slavery. Today it is illegal to take sea turtles of any species during the nesting season, April 1-November 30.

At this point let me interject that we are fortunate to have Winston Leonard, President of Leonard's Seafood in Tortola, present with us at this Symposium and he has provided the following socioeconomic information to give you an idea of the price of sea turtle products in the BVI prior to the 1986 legislation, which closed the fishery during the months of April to November.

- Whole turtles: \$1.00-\$1.50 per pound
- Turtle meat: \$3.00-\$3.50 per pound

Six local restaurants regularly sold turtle (20-25 lunches per week) at approximately \$8.00 per meal. Thus, turtle was worth \$1,000 - \$1,200 in restaurant income per week.

- No eggs sold; local consumption

- Shell: harvested heavily until late 1940's, then decline because fewer turtles were caught (heavy exploitation) and plastics and other substitutes were cheaper. Price: \$75.00-\$100.00 per shell. Jewelry never a big item; apparently no export
- Leatherback oil: local medicinal uses. Price: \$30.00 per "fifth" (187.5 ml)
- Male genitals (Green, Hawksbill): dried and sold. Price : \$20.00 per piece (approximately one-inch). Currently only legal in winter months and selling for as much as \$50.00 a piece when you can find it.

The opportunistic poaching of sea turtle eggs, also illegal from April to November, remains a serious threat to sea turtle conservation. While all factors tend to indicate that the level of poaching has decreased in recent years, the proportion of nests poached per season remains unknown. It is possible that the Leatherback turtles have been the most severely affected because of their restricted nesting range and the ease of nest identification. Hawksbill and Green turtles have much broader nesting ranges, encompassing numerous isolated beaches on the main islands and on the offshore cays. Presumably, this helps to offset the poaching pressure on these species.

Today, because no one depends on sea turtles for either food or income, there is general support for the eight-month closed season. But enforcement, as always, is a problem. Currently, the primary threats to sea turtles in the BVI are the illegal take of eggs and the destruction of nesting beaches, often due to sand mining.

Although sand mining is prohibited except by a special permit and is theoretically prohibited under all circumstances when it is likely to result in shoreline erosion, some beaches in the BVI are currently being mined to the extent that huge saline ponds are created in the mining pits. Some of these beaches, including Bluff Bay (Beef Island) and Josiahs Bay, Fat Hog Bay, Lloyds Beach, and Capoons Bay on Tortola, were once sea turtle nesting areas. Bluff Bay may still support limited nesting, but turtles no longer visit the others.

There is some evidence that mining affects more than just the beach where sand is removed. The excavation at Josiahs Bay may be starving adjacent beaches to the west (Cooten and Carrot) which are now cobble, but, according to the older fishermen, were once broad and sandy and regularly visited by Leatherback sea turtles. Today, Leatherbacks nest only on beaches further to the east on Tortola and Beef Island. In May of 1987, the miners of Josiahs Bay were brought to court on charges of permit violations, but the case was dismissed on a technicality. Too often there is little support in the courts for environmental law.

Marine degradation is also a problem and has resulted primarily from dredging and indiscriminate mooring. Dragline dredging has caused extensive damage to sea grass beds, which are important Green turtle foraging areas. Similarly, heavy anchors, primarily those of the "mini-cruise ships" are causing great damage to both sea grass and coral reef areas. The Dive Operators Association is particularly concerned about this problem because popular dive sites off Salt Island, Pelican Island, Ginger Island and others show an increasing level of shattered coral heads and broken reefs. To give you an example of the magnitude of this problem, an estimated 17,000 boats anchored in North Sound, Virgin Gorda, between 1977-1980.

The Dive Operators Association is working in close cooperation with the Ministry of Natural Resources and the National Parks Trust to determine where vessels should anchor to cause the least amount of damage, and is lobbying hard to force the government to require the cruise industry to pay for their own moorings. A single mooring costs about \$50,000.

Other problems include the bleaching of reefs, which is rare but very damaging and the increasing problem of garbage dumped from visiting cruise ships and sailboats. Finally, a small but growing foreign long line industry is threatening the livelihood of local fishermen as well as sea turtles which are taken as incidental catch.

The conservation of marine turtles in the BVI requires appropriate planning and enforcement which must come through adequate research and education. While the cultural and traditional uses of the marine turtles must be considered, the status of the local nesting and foraging populations should be the most important factor in any decision-making process. The status of local populations is not known exactly, but there are enough indicators to make some informed decisions regarding protection of important nesting beaches and the need for a closed season. Thus, the 1986 amendment to the 1959 Turtles Ordinance lengthened the closed season and protected Trunk turtles for the first time.

Survey and research projects, public awareness, legislation and enforcement efforts will all contribute to an effective long-term conservation strategy. As we continue to build our database, we are grateful that funds from WATS II allowed beach surveys to be carried out on the northeast coast of Tortola between April and July 1987. Nine Leatherback nests were recorded on 4 beaches during this time. This represents a precipitous decline from reports of as many as six turtles nesting per night in the 1920s and 1930s. Of the 3 or 4 Leatherbacks nesting this year, one was definitely killed and reports indicate that a second one may also have been captured.

The problems of small numbers of nesting Leatherbacks and difficult access to the four or five potential nesting beaches makes monitoring and enforcement very inadequate with the resources available. There is every likelihood of the Leatherback becoming extinct as a nesting species in the BVI in the near future. We are doing everything we can, including closed seasons on sea turtles and eggs, evaluating potential Marine Parks to protect foraging habitat, developing environmental awareness programs in the schools, giving seminars to local business groups and working with divers, fishermen, tourists and developers to ensure that we do not lose our Green and Hawksbill turtles as well. Sea turtles have given much to the people of the British Virgin Islands; we feel it is time to give back to the turtles the right to survive.

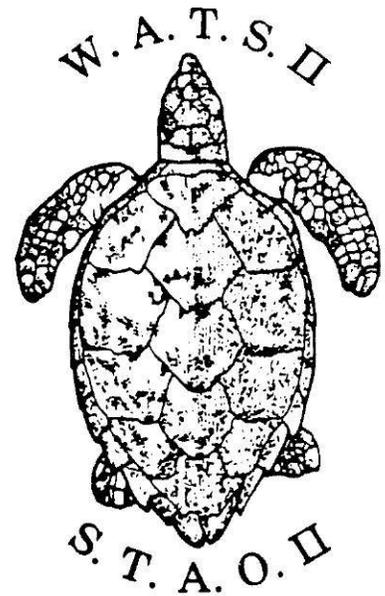
Thank you.

WATS II REPORT/DATA SET

National Report to WATS II for the
British Virgin Islands.

Bertrand Lettsome.

10 October 1987.



WATS2 046

BRITISH VIRGIN ISLANDS (BVI) NATIONAL REPORT

WESTERN ATLANTIC TURTLE SYMPOSIUM 11

Marine turtles have played an important role in the cultural and socio-economic development of the British Virgin Islands (BVI). Although there has never been an established commercial export of turtles, the three species that exist locally, (the hawksbill, green, and leatherback), have been extensively exploited at the subsistence level. The local turtle fishery has been family or community oriented and, although there has been a significant decline in the fishery, that trend continues today.

The leatherback or trunk fishery was not as important economically as the hawksbill/green fishery because of its seasonal nature (taking place only during the nesting months, March-June). In addition, there was not a large market for the primary product derived from the animal, which was oil. The meat and eggs were distributed in a subsistence fashion among families and the community. What this fishery lacked in socio-economic importance, however, it made up for culturally. 'Trunking' is deeply rooted in tradition and mysticism. Some fishermen trace the roots of the fishery back to the days of slavery, while others believe it was actually brought over from Africa like so many other local customs.

The opportunistic poaching of sea turtle eggs (all species), remains a serious threat to sea turtle conservation. While all factors tend to indicate that the level of poaching has decreased in recent years, the proportion of nests poached per season remains unknown. It is possible that the leatherback turtle has been the most severely affected because of their restricted nesting range and the ease of nest identification. Hawksbill and green turtles have much broader nesting ranges, encompassing numerous isolated beaches on the main islands and on the offshore cays. Presumably, this helps to offset the poaching pressure on these species. It is currently illegal to take sea turtles eggs, (all species), between April 1 - November 30, inclusive.

The conservation of marine turtles in the British Virgin Islands requires appropriate planning and enforcement which must come through adequate research and education. While the cultural and traditional uses of the marine turtles must be considered, the status of the local nesting and foraging populations should be the most important factor in any decision-making process. The status of local populations is not known exactly, but there are enough indicators to make some informed decisions. For instance, the 1986 amendment to the 1959 Turtles Ordinance lengthened the closed season and protected the trunk turtle for the first time. Survey and research projects, public awareness, legislation and enforcement efforts will all contribute to an effective long-term conservation strategy.

Funds from WATS allowed a series of beach patrols to be carried out on the Northeast side of Tortola between April - July 1987. Leatherbacks were found to have nested on four (4) beaches on nine (9) occasions. It appears that three to four (3-4) females nested this year. Fishermen definitely caught one female and reports indicated that one additional female may also have been captured.

The problems of small numbers of nesting leatherbacks and the difficult access to the four or five (4-5) potential nesting beaches, makes monitoring and enforcement very inadequate with the resources available. There is every likelihood of the leatherback becoming extinct as a nesting species in the British Virgin Islands (BVI) in the near future.

Bertrand Lettsome
Bertrand Lettsome
Conservation Officer

I. Introduction

Marine turtles have played an important role in the cultural and socio-economic development of the British Virgin Islands (BVI). Although there has never been an established commercial export of turtles, the three species that exist locally (the hawksbill, green, and leatherback; section II) have been extensively exploited at the subsistence level. The local turtle fishery has been family or community oriented and, although there has been a significant decline in the fishery, that trend continues today.

Hawksbill and green turtles are mainly captured by the use of nets, while leatherbacks are captured on the beaches during nesting. The fishery can be separated along these lines because there is no overlap -- the leatherback fishermen, known locally as 'trunkers', are not involved in the hawksbill and green turtle fishery, and vice-versa. The hawksbill and green turtle fishermen, known locally as 'turtle fishermen', are generally true fishermen who set turtle nets in addition to their fish traps. Thus the marine turtle fishery in the BVI includes two separate entities: the leatherback ('trunk') fishery and the hawksbill/green fishery. As a result, two distinct sets of cultural and socio-economic traditions with regard to marine turtles have evolved.

The hawksbill/green fishery was widespread historically, being concentrated in the major fishing villages on each island (e.g., The Settlement, Anegada; North Sound and The Valley, Virgin Gorda; East End, Long Looe, Baugher's Bay, and Road Town, Tortola; Great Harbour and East End, Jost Van Dyke). Nets were set throughout the territory from Anegada to Jost Van Dyle. The art of knotting, hanging, setting and hauling turtle nets, along with the handling and processing of the animals, was passed on from generation to generation within families and through apprenticeships. Turtle meat was an important and readily available source of protein. Today, during the season when local restaurants are permitted to buy and sell turtle meat (1 December-31 March, section 4.21), it is still a popular delicacy, commanding a similar price to conch and whelk.

Traditionally, the shells ('turtle backs') of both hawksbills and greens were cured, cleaned and sold. In those early days (ca. 1940's), shells, particularly hawksbill, were in demand by local craftsmen and thus fetched a good price. The sale of shells was a major source of income for the fishermen. Apparently there was also some export of shells that were purchased from the fishermen by wealthy residents. Soon, however, the onset of plastics and substitutes, perhaps coupled with international pressure for sea turtle protection, drove the regional demand down and the shell trade declined. From then until the present time the shells have been sold locally, given away, or kept by the fishermen to be mounted in private homes, clubs, restaurants and hotels. The local artisanry also declined and today is virtually non-existent (section 3.3).

The leatherback, or trunk, fishery was concentrated in villages close to leatherback nesting beaches on Tortola and Virgin Gorda. This fishery has declined significantly and, by 1986 when a closed season was established for

trunk turtles (section 4.21), the harvest had been reduced to the nesting beaches along the northeast coast of Tortola. The fishermen claim that they never took both turtle and eggs, in accordance with sections 3(d) and (e) of the now amended 1959 Turtles Ordinance, but this cannot be verified. In any event, nesting populations have seriously declined. Fishermen claim that as many as six trunks per night nested in the 1920's on beaches such as Josiahs and Long Bay, Lampert (Tortola) where only two or three females nest per season today. There are also numerous beaches where the animals no longer nest at all (e.g., Trunk Bay, Virgin Gorda; Little Bay, Lampert, Tortola; White Bay, Guana Island).

The leatherback or trunk fishery was not as important economically as the hawksbill/green fishery because of its seasonal nature (taking place only during the nesting months, March-June). In addition, there was not a large market for the primary product derived from the animal, which was oil. The meat and eggs were distributed in a subsistence fashion among families and the community. What this fishery lacked in socio-economic importance, however, it made up for culturally. 'Trunking' is deeply rooted in tradition and mysticism. Some fishermen trace the roots of the fishery back to the days of slavery, while others believe it was actually brought over from Africa like so many other local customs.

Over the years knowledge has been gained about the trunk turtle (the nesting cycle, the arts of 'turtle watching', capture, slaughter and preparation) through practical experience. There is also a certain 'mystical knowledge' about the animals that is not so easily or logically explained. The sighting of the silhouette of a trunk turtle in the clouds (with the head of the turtle pointing in the direction of the chosen nesting beach) is the most widely experienced phenomenon; it is commonly experienced at the community level, with everyone being capable of recognizing the silhouette and sounding the alarm to watch for the expected animal. I have personally experienced this silhouette on numerous occasions from when I was a small boy until now and there are several documented cases of trunk turtles being caught as a result of these signs in the sky. Noises in the bushes, sticks breaking, whistling, human voices, strange odors and ghosts of deceased trunk fishermen have been reported to take place just prior to the emergence of the turtles on the beach. When a trunk was slaughtered, the head, back, belly plate (=plastron), flippers and internal fat were boiled in sea water in a copper kettle on the beach. As the oil rose to the surface, it was siphoned off and bottled (section 2.3). Remains and entrails were buried well behind the beach; care was taken not to contaminate the beach or the nearshore water with any part of the turtle because it was believed that this would prevent turtles from nesting in the future.

While the tough meat of the trunk was not as popular as that of the hawksbill or green turtle, the eggs and the oil were (and are) prized for their reputed aphrodisiac qualities. In addition, trunk oil has considerable medicinal value, having been used traditionally for the treatment of severe colds and other general respiratory diseases in the BVI.

The opportunistic poaching of sea turtle eggs (all species) remains a

serious threat to sea turtle conservation (section 4.231). While all factors tend to indicate that the level of poaching has decreased in recent years, the proportion of nests poached per season remains unknown. It is possible that the leatherback turtle has been the most severely affected because of their restricted nesting range and the ease of nest identification. Hawksbill and green turtles have much broader nesting ranges, encompassing numerous isolated beaches on the main islands and on the offshore cays. Presumably, this helps to offset the poaching pressure on these species. It is currently illegal to take sea turtle eggs (all species) between April 1-November 30, inclusive (section 4.21).

The BVI participates in a number of regional and international treaties and organizations that are concerned with the conservation of sea turtles, including the Convention on International Trade in Endangered Species (CITES), the Cartagena Convention ("Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region", UN Environment Programme, 1983), the Western Atlantic Turtle Symposium (WATS), and the Wider Caribbean Sea Turtle Conservation Network (WIDECAST). In addition, the hawksbill, green and leatherback turtles are listed as 'endangered' under the First Schedule of the 1976 BVI Endangered Animals and Plants Ordinance.

In 1985, the BVI Ministry of Natural Resources, reflecting government policy, made the conservation of sea turtles a priority. A joint research project (the BVI Sea Turtle Survey) was initiated by the National Parks Trust and the Conservation Office of the Ministry of Natural Resources. Funding for the project was solicited locally, as well as from WATS.

In 1986, technical assistance was sought from Ms. Karen Eckert, former Director of the Sandy Point Leatherback Research Project on St. Croix, USVI. Public awareness and education programs about marine turtles were started and continue through public lectures, classroom slide shows, radio interviews, and newspaper articles. A volunteer network has recently been established under the guidance of the WIDECAST concept to assist in data collection and population monitoring for the BVI Sea Turtle Survey. The network consists of students, divers, fishermen, boat captains, government personnel, and other interested citizens. In April 1987 a twice-weekly boat survey of the inaccessible beaches of the northern coast of Tortola and the northeast cays (Guana Island to Scrub Island) was initiated. This effort will concentrate on leatherbacks until late June, and then, until October, beaches will be surveyed where hawksbill and green turtles have been reported to nest.

The conservation of marine turtles in the BVI requires appropriate planning and enforcement which must come through adequate research and education. While the cultural and traditional uses of the marine turtles must be considered, the status of the local nesting and foraging populations should be the most important factor in any decision-making process. The status of local populations is not known exactly, but there are enough indicators to make some informed decisions. For instance, the 1986 amendments to the 1959 Turtles Ordinance lengthened the closed season and protected the trunk turtle for the first time (section 4.21). Survey and research projects, public awareness, legislation and enforcement efforts will all contribute to an effective long-term conservation strategy.

II. Species and Distribution

2.1 Caretta caretta. Loggerhead Sea Turtle

There are no indigenous common names applied to the species; the preferred name is "loggerhead". The loggerhead is recognized by its large head, thick, somewhat tapered shell (=carapace), and characteristically heavy encrustation of invertebrate epifauna (especially barnacles). The large head and strong jaws, for which the species was named, are necessary adaptations to a diet of molluscs and hard-shelled crabs; tunicates, fishes, and plants are also eaten. Adults attain a carapace length of 120 cm (straightline, nuchal notch to posterior tip) and weigh up to 200 kg (Pritchard et al., 1983).

The species has a predominantly temperate distribution, with the greatest numbers of nesting females recorded along the Atlantic coast of Florida (USA) and on Masirah Island (Oman). Nesting is occasionally reported along the Caribbean coast of Central America (e.g., Belize, Nicaragua), but only rarely in the West Indies (e.g., Puerto Rico, Dominican Republic, Jamaica). Loggerheads are not known to nest in the BVI.

Loggerheads are periodically net-caught in the BVI, generally off the Island of Anegada. The fishermen report that the meat is disliked (too oily) and that the turtle is often released unharmed when caught. Winston Leonard (Leonard's Sea Food, Ltd.), a resident of Tortola with a close association to the fishing community, reports that four loggerheads were caught in 1985 and three in 1984. There are no data available to specify what age/size classes are caught most often, or whether the loggerhead is a year-around resident.

While the loggerhead presumably forages in BVI waters, dietary requirements are not known, nor have preferred foraging areas been delimited. The species is believed to be considerably rarer in BVI waters than either the green turtle or the hawksbill.

2.2 Chelonia mydas. Green Sea Turtle

There are no indigenous common names for the species other than "green turtle", or "turtle". The green turtle is recognized by its round, blunt beak (slightly serrated) and smooth carapace plates (=scutes) that do not overlap as they do on the hawksbill sea turtle (section 2.4). The carapace is generally devoid of barnacles. Adult green turtles in the eastern Caribbean (West Indies) attain weights of 230 kg, considerably larger than their conspecifics in Central America (150 kg). Adults generally measure 95-120 cm. straightline carapace length (nuchal notch to posterior tip), and are most common in the BVI during the summer months. Juveniles of varying sizes are present throughout the year.

Green turtles feed primarily on seagrasses (Thalassia, Syringodium, Halodule), maintaining feeding "scars" by returning to the same area of seagrass meadow to forage every day. The scars are maintained by regular cropping for several months and the new growth, rich in vitamins and nutrients and low in lignins and other structural materials, is preferred. When the

cropped grasses show signs of stress (blade thinning, lengthening of inter-nodal distance), the turtle abandons the scar and moves on to form another. Known foraging areas in the BVI are summarized in Table 1.

Green turtles have been traditionally netted in the BVI, and occasionally speared. There are also accounts of fishermen cornering green turtles in the shallows of Trellis Bay (Beef Island) and literally running them onto the beach. Nets set within a kilometer of shore commonly yield green turtles and sometimes small hawksbills, while those set further away (2-3 kms) catch predominantly hawksbills. All sizes, ranging from about 24 cm to mature adults are landed. There is currently no export of green turtles; those not sold to local restaurants are sold to or shared with members of the community.

People from St. Martin (and perhaps other nations of the Lesser Antilles) once traveled to Tortola twice a year to purchase carapaces of both green and hawksbill turtles; presumably the shells were marketed on other islands. This activity has markedly declined in recent years as fewer green turtles have been landed in the BVI.

It has been reported that 600 green turtles were landed in 1981, and an additional 100 caught incidentally (Fletemeyer, 1981). Winston Leonard estimates that 250 greens were landed in 1983, 225 in 1984, and 200 in 1985. His figures were computed by doubling the reported catch on the island of Anegada, where most of the turtles are caught. Informed opinion in the Ministry of Natural Resources concurs with Leonard's figures, while a former Fisheries Officer tends to believe that the current catch may be closer to that reported in 1981. Presumably the catch will decline significantly when the 1986 amendments to the 1959 Turtle Ordinance (section 4.21) take effect.

All parties agree that the catch of green turtles is declining, but the reasons are not clear. Some fishermen maintain that catches have declined simply because there is no real market for the turtles anymore; thus, fewer are brought in. Others concede that the turtles have been over-exploited and this has precipitated population declines that have resulted in reduced catch per unit effort; consequently many fishermen have turned to more abundant commercial fishes for their livelihood and to conch and lobster which bring high prices. The over-exploitation hypothesis is supported by older residents who report a great abundance of sea turtles (both nesting and in the water) when they were young, far more than are present now. Given that several hundred turtles are landed annually without regard for the number of turtles present (and that eggs are widely collected), this contention seems reasonable.

Green turtles probably still nest throughout the BVI, though nowhere in large numbers. Information is scarce as to which beaches are most important to the species; known nesting sites are summarized in Table 2. Green turtles prefer to nest on open beach platforms, as opposed to rocky or vegetated beaches. Nests are characterized by a deep pit (1.5-2 m wide and 1 m deep) and a symmetrical crawl (1-1.2 m in diameter) leading to and from the ocean. Gravid females will cross submerged coral and rock to reach suitable nesting beaches. It is not known how many nests a female will deposit during a given season, but it is believed (on the basis of information available from other

areas) to be 3-6. 120-150 yolked eggs are laid per nest; nests are commonly deposited on 12-14 day intervals. Nesting is nocturnal.

2.3 Dermochelys coriacea. Leatherback Sea Turtle

The leatherback turtle is locally known as the 'trunk'. Leatherbacks are the largest and most pelagic of the sea turtles, weighing 300-500 kg. Leatherbacks lack a boney shell and cornified epidermal scales; the smooth, black skin is spotted with white. The carapace is strongly tapered, generally measures 130-165 cm in length (straightline, nuchal notch to posterior tip), and is raised into seven prominent ridges. Powerful front flippers extend nearly the length of the body.

Leatherbacks are seasonal visitors, migrating from temperate foraging grounds to nest on BVI beaches between March and July. All indications are that historical nesting was higher than it is now. Some BVI beaches were named after the leatherback turtle (e.g., Trunk Bay, Virgin Gorda) and once supported leatherback nesting (section I). Few beaches support leatherback nesting today (Table 2). An active subsistence fishery directed toward the species for most of this century has surely contributed to the population decline. Five "cells" of leatherback nesting may still exist, the primary one being five to six kilometers in length and including the high energy beaches on the northeast coast of Tortola from Long Bay (Beef Island) to Trunk Bay (Tortola). Less important areas are potentially (1) Anegada, (2) Virgin Gorda (Valley Trunk Bay used to support leatherback nesting, but Winston Leonard reports that they have been exterminated), (3) Peter Island, and (4) Sandy Cay/Jost Van Dyke.

The leatherback fishermen ('trunkers') are currently few in number and are, for the most part, elderly. There are several mystical aspects to the trunk fishery; the fishermen speak of music, unexplained movements in the vegetation, and maintain that they see turtle-shaped apparitions in the clouds that point to the beach where the female will lay her eggs. The unique cultural ties to the trunk turtle prompted initial efforts by the BVI Ministry of Natural Resources to study and protect the remaining BVI leatherbacks.

Leatherbacks have traditionally been killed for meat and oil. Trunk fishermen report that fifty to sixty gallons of oil can be rendered from a "big" leatherback and perhaps 35 from a "small" one. The exact figure is difficult to estimate because the oil is routinely poured into assorted household containers and the absolute volume is rarely calculated. One source reported that 15-20 40-ounce bottles of oil were obtained from each turtle. Prices apparently range from \$20-\$40 per 40-ounce bottle. Drinking the oil "makes you strong" and is sometimes reputed to have aphrodisiac qualities. The oil is most commonly used for medicinal purposes, generally in cases of respiratory congestion.

The trunk fishermen await the nesting females during the hours of high tide, believing that this is the most likely time of arrival; the full moon is preferred. When a turtle comes ashore, she is flipped over onto her carapace. A machete is used to cut a hole in each front flipper, and her front flippers are tied over her plastron (belly). She is left until morning when the whole village community comes to share in the harvest. Women bring pans to carry

chunks of meat home, and the men dismember the turtle and boil it in large caldrons on the beach to render the oil. Traditionally, some oil is shared with the community and the rest is sold locally. Sales have dropped in recent years, however, and the lower demand lessens the desire of the young men to perpetuate the fishery.

Leatherbacks were afforded legal protection for the first time in 1986 (section 4.21) and the taking of nesting females is expected to subside. There is, however, no enforcement capacity and it is yet to be seen how effective the closed season (April-November, inclusive) will be. While less than six leatherbacks have been killed per annum over the last decade, it is possible that this low number represents a majority, if not all, of the leatherbacks nesting annually on Tortola. Leatherbacks may still nest on Sandy Cay and apparently nest in low densities on a few beaches on Virgin Gorda. There are also infrequent reports of nesting on the western shores of Anegada.

A recent threat of unknown magnitude involves the catching of leatherbacks on long lines baited with squid. Foreign (USA) vessels pay the government of the BVI a fee of US\$7,000 (1987) per season (November-May, inclusive) to fish swordfish using long lines. The lines (ca. 35 miles in length) are set north of Anegada in 1000-2000 fathoms of water; hooks hang at 50 fathoms. Incidental catch is reported to include many nontarget species -- sea turtles as well as commercial fishes important to the livelihood of local fishermen on Anegada. The Fisheries Officer reports that a leatherback was hooked in March of 1987 and released apparently unharmed after the hook and line were cut. There is no information as to often sea turtles are incidentally caught in long line operations; it is critically important that this information be collected.

2.4 Eretmochelvs imbricata, Hawksbill Sea Turtle

The hawksbill is distinguished by a narrow, pointed beak with which it prys sponges and other soft-bodied organisms from the reef. The carapace is often posteriorly serrated and the carapace scutes overlap, like shingles on a roof. Adults rarely exceed 80 kg and a carapace length of about 90 cm (straightline, nuchal notch to posterior tip). Bright mottled coloration (brown, orange, gold) is common.

Hawksbills have proven to be difficult animals to study and very little is known about Caribbean populations in general. Gravid females often nest on tiny, isolated beaches (including those flanked by exposed coral and rock) that are hard for biologists to reach on a consistent basis. Nesting occurs with little seasonality throughout most of the year. The species is believed to be relatively sedentary; nesting and foraging areas may be adjacent to one another. Nesting females are easily frightened and routinely retreat as far as possible into supralittoral vegetation (e.g., Coccoloba) before nesting. Consequently, little evidence of the nest exists aside from a faint asymmetrical crawl (about 0.7 m wide) leading to and from the ocean. Known nesting areas are summarized in Table 2.

Hawksbills are generally net-caught in BVI waters, but are occasionally speared. They are found most often in nets that are set some distance from shore (often 3-4 kms) in reef areas. Size classes from 24 cm to mature adults

are landed, although the smaller turtles are surely below the legal 20 pound limit (section 4.21). Known foraging areas are summarized in Table 1.

The exquisite beauty of the shell scutes has long played a central role in jewelry and ornamentation in the Caribbean. Buyers from the Lesser Antilles (especially St. Martin) have been known to purchase hawksbill shell (known as 'tortoiseshell') on Tortola, presumably for resale on other islands. This activity has declined in recent years (section 1). Some imported tortoiseshell jewelry was found for sale in Road Town, Tortola, in 1987 (section 3.3).

The number of hawksbills harvested has declined slightly in recent years. According to Winston Leonard, approximately 75 hawksbills were landed in 1985, 75 in 1984, and 100 in 1983 (as calculated by doubling the number of landings recorded for Anegada). Fletemeyer (1981) reported that 300 hawksbills were landed in 1981, with an additional 100 incidentally caught. It is generally believed that there has been a decline in stocks over recent decades, and few fishermen currently target hawksbill turtles.

2.5 Lepidochelys kempi, Kemp's Ridley Sea Turtle

There are no records of Kemp's Ridley sea turtles foraging or nesting in the BVI.

2.6 Lepidochelys olivacea, Olive Ridley Sea Turtle

There are no records of Olive Ridley sea turtles foraging or nesting in the BVI.

III. Stresses on Sea Turtles in the British Virgin Islands

3.1 Destruction or Modification of Habitat

Briefly, the destruction or modification of terrestrial (beach) habitats has been accomplished by sand mining (section 4.131), shorefront development (sections 4.132, 4.133), roads and fences. Marine degradation has resulted primarily from dredging and indiscriminate mooring (sections 4.111, 4.147). The bleaching of reefs (sections 4.111, 4.142), ocean dumping (section 4.144), and upland deforestation have caused problems to a lesser extent.

3.2 Disease or Predation

There are no data on the extent to which disease affects sea turtle populations in the BVI. Natural causes of mortality differ among life stages, but it can be assumed that beach erosion, crabs and birds take eggs and hatchlings; sea birds and reef fishes take hatchlings; sharks take juvenile and adult sea turtles. In contrast to the situation in the neighboring United States Virgin Islands (USVI), there are few problems with feral or exotic animals. Mongooses (Herpestes auropunctatus) are present on Tortola and Jost Van Dyle, but the depredation of sea turtles nests is not reported. Wild dogs are few in number and do not constitute a problem (for sea turtles) at this time.

3.3 Over-Utilization

Product demand (jewelry, shells, curios, trunk oil) and restaurant demand

(meat, soup) have both contributed to the decline of sea turtle stocks in the BVI. In addition, the personal consumption (as opposed to commercial sale) of meat and eggs has traditionally affected all three of the most commonly occurring sea turtle species: green, hawksbill, and leatherback (trunk). The BVI is fortunate in that it has never had a commercial import/export industry in turtles, and thus has not experienced the dramatic population declines that have accompanied such ventures in other nations.

In 1987, turtle products were found for sale in Road Town, Tortola. In one store, tortoiseshell (hawksbill shell) bracelets and earrings were offered at US\$15.00 each. The products were imported, but the source country was not known by the clerk who expressed the opinion that the items were high priced and difficult to move and would probably not be ordered again. In a second store, bracelets for US\$9.00 and rings for US\$8.00-\$10.00 were labeled "Farmed Green Turtle Products" from the Cayman Islands. Importation of sea turtle products is illegal under the BVI Endangered Animals and Plants Ordinance (1976), but it is apparently legal to transfer Cayman products among British territories. The sale of all sea turtle products, 'farmed' or not, should logically be banned, however, since they are intended for sale to tourists who will simply have them confiscated upon entry into the United States or the United Kingdom.

An artisan in The Valley (formerly Spanishtown), Virgin Gorda, reported that tortoiseshell had not been offered for sale on that island since perhaps 1984. He used to buy the scutes locally and fashion them into jewelry, but hassel from divers and USVI enforcement officers prompted him to abandon the art. Scutes were purchased from turtles that had been killed for meat; turtles were not killed specifically for ornamentation. Generally the scutes were removed after soaking the carapace in water, but sometimes the entire shell was purchased and polished for sale. Whole shells from juvenile and adult hawksbills and greens, obtained before the present concern for the status of sea turtle species, grace the walls of local restaurants, hotels, and businesses. At the present time, whole shells are rarely offered for sale in local gift shops, but juvenile hawksbill shells were reported for sale in the airport restaurant (Beef Island) in 1986. Fishermen report that shell used to bring \$16-\$35 a pound, but there is no market today.

Restaurant demand has traditionally focused on the green sea turtle and locally popular dishes were common restaurant fare before the 1986 amendments to the Turtles Ordinance (section 4.21) extended the closed season from April through November. Turtle stew was a high price item, selling for approximately US\$7.00. The availability of turtle in local restaurants is expected to decline following passage of said amendments. At least one restaurant in Road Town, Tortola, contacted the Conservation Officer (BVI Ministry of Natural Resources) in April of 1987 to ask advice concerning frozen sea turtles left in the freezer that could not then be sold because the new closed season had commenced. These 'transition problems' are easily solved, and it is heartening to see such community awareness and a willingness to cooperate with the new law.

3.4 Inadequate Regulatory Mechanisms

A basic problem with respect to environmental law enforcement in the BVI is that there is no enforcement branch specifically dedicated to the protection of natural biotic and abiotic resources. Police Officers are responsible for enforcing all legal statutes in the Islands and, understandably, there is a distinct lack of personnel available for patrols of beaches, markets, boat landings, and open water. Officers often lack an awareness of conservation ordinances and regulations. In February 1986, a workshop entitled "Environmental Law Enforcement" was sponsored by ECNAMP and held on Tortola. All government Ministries were involved. The purpose of the workshop was to bring conservation law to the attention of all parties. Workshops such as this should be repeated regularly.

The Fisheries Officer has the power to enforce fisheries laws and has recently been given a boat to allow him to regularly patrol offshore areas. This should have a significant positive impact on the degree to which fishermen respect existing laws; there is a general sentiment among the fishermen that they will begin to follow the regulations as soon as the government makes some effort at enforcement. Otherwise, they feel that they will be 'missing out' by obeying the laws while their competitors ignore them.

Further discussions of law enforcement are offered in sections 4.123, 4.22 and 4.24.

3.5 Other Natural or Man-made Factors

Hurricane Frederic (September 1979) devastated some reefs in North Sound, Virgin Gorda, but neither Hurricane David (August 1979) nor Hurricane Allen (August 1980) caused significant damage to BVI reefs (Rogers et al., 1982).

IV. Solutions to Stresses on Sea Turtles in the British Virgin Islands

4.1 Manage and Protect Habitat

The decline in sea turtle stocks has occurred in concert with the depletion of fisheries resources in general. Fishermen, whether part-time or full-time, consistently agree that fishing is not what it used to be. Easily accessible areas that were once lucrative fishing spots are now not worth visiting. This is true regardless of whether the targeted species are fishes, lobsters, or conch. Statistics for Anegada, where the majority of fish are caught in the BVI, are most telling. Koester (1987) reports that fish, lobster and conch have all declined in Anegadan waters over the last several decades, and quotes one fisherman saying that he now sets twice as many traps (40 vs. 15-20) but only catches one-third (140 pounds vs. 400 pounds/week) of what he hauled twenty years ago. Other fishermen reported that they now set three times the number of traps that they once did. Furthermore, not only are fewer fish caught per unit effort, they are uniformly smaller in size. The use of spear-guns, SCUBA, and bleach and other chemicals have all added to resource depletion as well as to overall environmental degradation (Koester, 1987). Habitats such as coral reefs and seagrass beds should be protected not just because they are important to endangered sea turtles, but because they are the basis for the livelihood of many BVI residents.

4.11 Identify essential habitat

This is a very difficult task for a nation consisting of more than 40 islands (29 with coastlines greater than one kilometer in length) and approximately 800 square kilometers of area (Fletemeyer, 1981). The BVI has jurisdiction over 948 square miles of shelf (less than 40 fathoms) and 83,000 square miles of deeper water. This makes the sea greater than 99% of the BVI territory (ECNAMP, 1984). There are numerous reefs and seagrass beds (Maps 1,2,3) and neither the government nor the private sector has the financial means or the manpower to survey them all. However, in lieu of a systematic national survey, valuable data can be gathered by divers, fishermen, and recreational boaters. Divers who lead SCUBA or snorkeling trips for tourists visit the same areas repeatedly and should be encouraged to keep records of turtles encountered as a means of monitoring stocks in localized foraging areas. Similarly, nesting activity can be monitored by volunteer activists and reported on a regular basis.

4.111 Survey foraging areas

Although valuable survey and biological data are available for the seagrass and reef communities of the BVI (ECNAMP, 1980; Rogers et al., 1982; Dunne and Brown, 1979), there is little information related to the specific use of these environments by marine turtles. Continuing efforts to refine existing knowledge are sponsored by the BVI Ministry of Natural Resources, National Parks Trust, Dive Operators Association, and the local WIDECAST network. Locations where green and/or hawksbill turtles have been reported surfacing and/or foraging are summarized in Table 1.

Seagrass meadows are essential in the diet of green sea turtles (section 2.2) and are very important to the ecology of coastal areas. Seagrass roots stabilize the sea bed and provide foraging habitat for fishes, conch, sea urchins, sea stars and many other invertebrates. Seagrass serves as a critical developmental habitat for several commercially important species. Much of the oxygen produced in the near shore water is generated in the sea grass beds, and these areas also contribute to the clarity of littoral zones by absorbing animal wastes and stabilizing sediments (ECNAMP, 1981).

In the BVI, sea grass communities have been adversely affected (or destroyed) by upland deforestation, coastal land reclamation, dredging, mooring and, more rarely, by pollution from sewage and agricultural chemicals. The islands, characterized by steep slopes, shallow soils and periods of drought and heavy rain, are vulnerable to erosion that releases large amounts of sediments into nearshore environments (ECNAMP, 1981, 1984). Mooring can also result in sediment loading. Seagrasses in Manchineel Bay (Cooper Island) and North Sound (Virgin Gorda) are described as unhealthy; gaps of bare sand result from boat anchoring (Salem, 1980; ECNAMP, 1981; Rogers et al., 1982).

Coral reefs are highly productive and of great economic importance. They serve as critical developmental habitats for commercially important species of fish and lobster. They protect coastal property and development investments by dissipating the energy of storm swells. In addition, they are utilized by green turtles for sleeping and shelter, and are important foraging sites for

hawksbills (section 2.4). Reefs are easily damaged by bleaching, mooring, siltation, and specimen collecting. Bleaching in Horseshoe Reef (Anegada) has been reported recently. If allowed to continue, this activity will result in the death of vast communities of coral. Fishermen from Anegada claim that the bleaching is practiced by 'Puerto Ricans' (probably from the USVI) and that the offenders are seeking lobster (section 4.142).

Private mooring sites have been established in several areas of the BVI. Public moorings are available at the Wreck of the Rhone Marine Park in order to accommodate and regulate increasing boat traffic; they have been successful at mitigating damage resulting from persistent and indiscriminant anchorage. While permanent moorings are expensive to establish and maintain, they should be viewed as an important option for the protection of fragile benthic communities (section 4.147).

Leatherback sea turtles are not reported foraging in the littoral zone. They do not feed in seagrass meadows or coral reefs, but rather upon deep-water species of medusae. Thus, they remain in deep waters between nestings and pass through the littoral zone only to reach suitable terrestrial nesting habitat.

4.112 Survey nesting habitat

The first attempt to draw together existing fragments of information relating to the utilization of beaches by nesting turtles was made by the Eastern Caribbean Natural Area Management Program (ECNAMP) in 1981. There was no original survey work in the ECNAMP program and no criteria of frequency or density of sea turtle nesting, nor were species identified (Maps 4,5,6). The first comprehensive attempt to survey nesting beaches in the BVI was initiated by John Fletemeyer for the Western Atlantic Turtle Symposium (WATS I). Fletemeyer conducted his survey over 12 days in July of 1981; the data, while understandably superficial, provides a starting point for future efforts.

In 1985, the BVI Ministry of Natural Resources and the National Parks Trust targeted sea turtles for survey and study (BVI Sea Turtle Survey, section I). Scientists were invited to train Ministry and Park personnel in the details of sea turtle natural history, and substantial public interest and media attention has been generated. Volunteer efforts to report sea turtles nesting are now underway and there are high hopes that the resulting data will greatly improve the ability of BVI biologists and managers to monitor important breeding beaches.

What is currently known of the nesting distribution of leatherbacks, greens, and hawksbills is summarized in Table 2. It is important to note that these data are preliminary. It is particularly important to seek verification as to whether green turtles or hawksbills (or both) nest on a given beach; there is currently little evidence to suggest that these species have been consistently correctly identified.

4.12 Develop area-specific management plans for important foraging and nesting areas

There are no specific management plans currently in place in the BVI for marine turtles. However, several proposed Park sites could potentially offer

protection to locally occurring sea turtles (e.g., Anegada, Sandy Cay). It is imperative that the most important nesting and foraging areas be delineated as soon as possible so that action can be taken to designate sensitive areas.

Area-specific management may involve a wide array of options, from designation of an area as a Park or protected area (and enforcement of existing regulations barring the take of turtles and eggs) to more elaborate solutions such as the establishment of a hatchery for eggs threatened by erosion or feral animals. In any case, mooring (section 4.147), dredging (section 4.147), sand mining (section 4.131), sewage and garbage disposal (sections 4.143, 4.144), land reclamation (section 4.147), artificial lighting (section 4.132), and the construction of seawalls and jetties (section 4.133) should be closely evaluated in important foraging and nesting areas. Excellent guidelines for selected management techniques are available in the Manual of Sea Turtle Research and Conservation Techniques (Pritchard et al., 1983).

4.121 Involve local coastal zone entities

The "local coastal zone entity" is closely approximated by the Conservation Officer in the Ministry of Natural Resources. The Ministry of Natural Resources is responsible to any land use decision that affects the foreshore or nearshore waters. For example, in order to build a hotel with a jetty, the Land Development Control Authority must grant permission to build the hotel and the Ministry of Natural Resources must grant permission to build the jetty (or remove mangroves, or reclaim land, etc.).

While it is fortunate that decisions affecting foreshore and nearshore habitats are overseen by Natural Resources personnel, the situation could be improved by requiring the Land Development Control Authority (and the Office of Town and Country Planning below it) to keep a list of environmentally important or sensitive areas to assist the Planning Office in making environmentally informed decisions. In the case of sea turtles, the list would include significant foraging and nesting areas.

Barbara Lausche (Natural Resources Lawyer, World Wildlife Fund) has been working closely with the BVI Ministry of Natural Resources and the National Parks Trust to develop two new pieces of legislation, the Coastal Conservation Act and the Nature Conservation Act. The project is part of the ongoing Natural Resources Management Project of the Organization of Eastern Caribbean States (OECS) and was undertaken at the request of the government of the BVI.

Part III of the draft Coastal Conservation Act includes "the basic policies and goals that apply to any development or management activities within the Coastal Zone." Part III of this Act, if adopted, would codify existing law principles, such as vesting of the foreshore (mean low water mark to mean high water mark) in the Crown, and reaffirm the public right to use all BVI beaches. Mechanisms to designate certain areas of the foreshore and sea floor as 'special resource areas' or 'special use areas' would be included and the principal regulatory tool, the coastal zone permit, would be provided for. Activities such as sand mining would be strictly regulated, with the burden of proof that the activity would not cause environmental damage resting with the applicant. Pollution of the coastal zone would be prohibited. Such

legislation is encouraged; it would offer important consolidation in coastal zone management and provide for necessary administrative and enforcement personnel.

4.122 Develop regulatory guidelines

When areas are defined as especially critical to remaining sea turtle stocks, regulatory guidelines will be essential in order to establish a framework within which appropriate land use and development (commercial, recreational, residential) can occur. For instance, development proximal to important nesting beaches should carry the requirement that beach-front lighting be designed in such a way as to prevent the disorientation of hatchlings or nesting adults (see Raymond, 1984). Activities such as jetties, sea walls (section 4.133), sand mining (section 4.131) and dredging (section 4.147) would need to be regulated in such a way as not to result in the erosion of terrestrial nesting habitat. Similarly, boaters should be prevented from indiscriminate mooring in reef or seagrass foraging areas (section 4.147).

4.123 Provide for enforcement of guidelines

Enforcement is important to the perpetuation of any management program. However, any guidelines will have to be formulated with the needs of the community in mind. Ideally, a general acceptance of the guidelines and of the importance of the habitat will result. Civic groups, proximal residents, and frequent commercial users (e.g., fishermen, divers) should be made thoroughly familiar with the management program and be responsible for reporting any violations that occur. In this way, limited enforcement personnel will not have additional burdens placed upon them. This does not lessen the importance, however, of familiarizing enforcement officers with the new guidelines and regulations and making sure that all reports of violations are properly addressed by the appropriate enforcement entity. An enforcement division devoted specifically to environmental law, such as has been established in the USVI, would be highly desirable (section 4.24).

4.124 Develop educational materials

Each management area should have materials developed that explain why it is an important ecological area. Materials can include signs or displays on site, fliers or posters placed in public areas (airports, hotels, government offices), books and pamphlets available from the Ministry of Natural Resources or the National Parks Trust, guided tours or field trips to the area, regular media attention, public forum slide shows or interpretive programs. Revenue can be generated by offering supervised access to protected areas and developing interpretive programming. The National Parks Trust has several excellent interpretive posters, pamphlets, books and maps available for currently protected areas. Funding and staff time are major impediments to the development of educational materials.

4.13 Prevent or mitigate degradation of nesting beaches

4.131 Sand mining

Although sand mining is prohibited except by special permit (section 4.21) and is theoretically prohibited under all circumstances when it is likely to result in shoreline erosion, the fact remains that some beaches in the BVI are currently being mined to the extent that huge saline ponds are created in the

mining pits. Some of these beaches, including Bluff Bay (Beef Island) and Josiahs Bay, Fat Hogs Bay, Lloyds Beach, and Capoons Bay on Tortola, were once sea turtle nesting areas. Bluff Bay may still support limited nesting, but turtles no longer visit the others.

There is some evidence that mining affects more than just the beach where sand is removed. The excavation at Josiahs Bay may be starving adjacent beaches to the west (Cooten and Carrot) which are now cobble but, according to the older fishermen, were once broad and sandy and regularly visited by leatherback sea turtles. Today, leatherbacks nest on beaches further to the east, e.g., Long Bay, Lampert on Tortola and Long Bay on Beef Island. It is imperative that closer attention be given to the evaluation of permit applications and to the oversight of permitted mining operations. In May of 1987 the miners on Josiahs Bay were brought to court on charges of permit violations, but the case was dismissed on a technicality.

The draft Coastal Conservation Act (Barbara Lausche, 1987; section 4.121) suggests that "all sand mining activities anywhere on the foreshore of the BVI and on any other lands where such mining would make inroads to the sea" be prohibited without exception. Applications for offshore sand mining would have to meet certain environmental conditions and the burden of demonstrating that the environment would not be adversely affected would rest with the applicant.

4.132 Lights

There are some beach areas that are heavily developed (i.e., Cane Garden Bay and Sophie's Bay, Tortola; St. Thomas Bay, Virgin Gorda; Great Harbour, Jost Van Dyke), but, although nesting occurs to a greater or lesser degree in each of these areas, there are no records of disorientation of adult turtles or hatchlings. There is a new development planned for Long Bay, Lampert (Tortola) which is one of the few remaining leatherback nesting areas. It is recommended in this case that the architect plan lighting regimes that do not result in beach illumination.

4.133 Beach stabilization structures

It is difficult to say what effect the construction of jetties has had in the BVI with regard to sea turtles; there are few historical data. Jetties are located on the islands of Anegada, Beef (Trellis Bay), Eustatia, Frenchman's Cay, Great Camanoe (Low Bay, Lee Bay), Little Thatch, Peter (Sprat Bay), Salt (Salt Island Bay), Tortola and Virgin Gorda (too numerous to list on the latter two islands). In specific instances, jetties are known to have destroyed adjacent beaches (e.g., the Buck Island jetty at the east end of Tortola; Fat Hog's Bay, Tortola), but it is not known to what extent these areas were useful to sea turtles. Coastal erosion resulting from the construction of a solid jetty, combined with nearshore dredging, has resulted in over 20 vertical feet of beach loss in recent years at Fat Hogs Bay, East End, Tortola (ECNMF, 1981).

4.134 Beach cleaning equipment

Beach cleaning machinery is not used in the BVI. Some beaches are, however, regularly cleaned by hand rake (e.g., Long Bay, Beef Island; Deadman Bay and White Bay on Peter Island) and personnel should be alerted to watch for

signs of sea turtle nesting and report crawls and hatchlings to the Ministry of Natural Resources.

4.135 Beach rebuilding projects

There are no beach rebuilding projects underway in the BVI, but artificial restoration of the dune line at Josiahs Bay and Fat Hogs Bay (Tortola) is planned.

4.14 Prevent or mitigate degradation of marine habitat

4.141 Dynamiting reefs

Koester (1987) reports that the fishermen of Anegada sent a petition to the BVI government (Road Town, Tortola) in 1984 "outlining a series of problems including spear-fishing, dynamiting [Horseshoe] reef and trap theft." According to the fishermen, the petition has never been acknowledged by the government. I was unable to confirm incidences of dynamiting by talking to fishermen and Fisheries Officers on Tortola. Presumably this kind of activity is rare, however it is strongly recommended that the government investigate these charges immediately and take whatever steps are necessary to prevent this potentially devastating environmental destruction from recurring.

4.142 Bleaching reefs

In 1986, a group of fishermen in Anegada reported that foreign fishermen (apparently Puerto Ricans) were bleaching portions of Horseshoe reef (section 4.111). The offenders, reportedly seeking lobsters, were never identified. The use of bleach (and other chemicals) in marine waters should be prohibited completely.

4.143 Industrial discharges

There is no heavy industry in the BVI, but sewage, phosphorous and anti-fouling paints were identified as potential problems. Sewage from Tortola that is not disposed of in a septic tank is released in 70 feet of water from a pipe that runs along the sea floor at Slaney Point. Here ample current dissipates the effluent and environmental degradation has not been noted. However, domestic septic tanks are often siphoned into collecting trucks which discharge their loads into the mangroves of Paraguita Bay (Tortola). Several people complained of foul smells in this area; some monitoring of the site should be initiated to assess the effect of the effluent on the area. If it is an important nursery for fishes, there is the potential that commercial fishes will be contaminated. Rogers et al. (1982) reports that sewage from Biras Creek (Virgin-Gorda) has damaged nearby benthic communities.

Phosphorous effluent from local laundry operations was identified as a possible source of nearshore degradation. Toxic anti-fouling paints are widely used in the yachting/cruise industry with apparently little disposal oversight.

4.144 At-sea dumping of garbage

Several categories of waste were identified as having been dumped at sea, including pitch (road surfacing), scrap automobiles, oil, gas, bottles, and tires. Items too bulky for the landfill are routinely disposed of off the shelf south of Peter Island (500 m depth). Here (and throughout the Caribbean) sewage, plastics, and other waste is getting to be a serious problem from the

yachting/cruise industry. Dumping violations by the boating community will be difficult to monitor and will require a concentrated effort at public education, coupled with convenient places to safely dispose of refuse on shore and stiff penalties for offenders.

4.145 Oil exploration, production, refining, transport

There has been some exploration during this decade (Mobil?) off the north coast of Tortola, and there is talk of offering further contracts. Nothing of significance has yet been discovered. There is some transport through BVI waters, including both fuel and crude, but no serious problems are reported.

4.146 Agricultural discharges (runoff)

Agriculture is not as important in the BVI as it once was. There is a government research station at Paraquita Bay (Tortola) and there is some chemical runoff associated with the various testing done there. Otherwise, agricultural techniques are traditional and few chemicals are used.

4.147 Others

Mooring, dredging, and land reclamation probably present a much clearer threat to the marine environment in the near future than does industrial or agricultural runoff, or oil exploration and transport. Dragline dredging in 1982 in the cove just south of Bitter End Yacht Club (Virgin Gorda) caused extensive damage to the seagrass meadows there (Rogers et al., 1982). Dredging currently proceeding in Trellis Bay (Beef Island) is also causing significant damage to benthic communities. Land "reclamation" is ongoing at several points on the coast of Tortola; the prerequisite filling of mangrove areas with garbage is unsightly and ultimately fatal to these unique and productive ecosystems.

An article in the BVI Beacon newspaper (date?) reports that 'mini-cruise ships' are becoming a topic of hot controversy. The industry began in 1979 and remains "completely unregulated", although the Director of Tourism has said that policies should be ready to implement in 1988. The yachting industry (claiming to represent 70% of the total tourist industry) objects to the freedom of cruise ships to anchor in every bay of the islands. Yachting representatives claim that the anchors and anchor chains of these larger vessels are doing enormous damage to popular reef areas.

The Dive Operators Association (hereafter, the 'Association') is very concerned about this problem. In 1986 there were two mini-cruisers in BVI waters; there were seven in 1987 and there may be fourteen in 1988. Passengers are loaded in Puerto Rico and St. Thomas (USVI) and spend a week anchoring from site to site in the BVI; one Association member likened it to turning the BVI into "a parking lot". Popular dive sites such as "The Settlement" (Salt Island), "The Indians" (Pelican Island) and "Alice in Wonderland" (Ginger Island) already show damaged seagrass beds and shattered coral heads from anchoring. Larger charter yachts like the 'Aquanaut Explorer' (live-aboard dive boat, 142-foot) reportedly do similar damage. Sometimes the magnitude of visitation is the problem rather than the size of the vessel. An estimated 17,000 boats anchored in North Sound (Virgin Gorda) between 1977-1980, causing widespread turbidity and damage to seagrass beds (Salm, 1980).

The Association has offered to survey proposed anchoring sites at no charge to the BVI government and to mark specific anchoring sites in such a way as to invite the least environmental damage. T-shirts ("Stop Reef Busting") are being sold by the Association and donations are being solicited to pay for the placement of permanent moorings. The Association believes that cruise ship companies should be required to contribute the cost of at least one permanent mooring (about US\$50,000) in order to be licensed to operate in BVI waters. The Association has labeled five of the eleven popular cruise-ship anchor sites as 'extremely sensitive' and in need of moorings (or strict anchoring regulations) if they are to survive the coming season: "The Settlement", Salt Island; "Great Harbour", Peter Island; "The Bye" and "The Caves", Norman Island; "Great Harbour", Jost Van Dyke.

There is no question that the widespread destruction of reefs and seagrass beds will eventually erode the economic base of the BVI; fisheries and water-based sports will decline. The government of the BVI is in a unique position to have been alerted to the dangers of unregulated mooring while there is still time to develop solutions that will accommodate visiting tourists, as well as the local industries they support and the living marine resources (including sea turtles) that they have come to see. Moorings are only one available answer; if chosen, they will require large initial investments and maintenance commitments. "Adopt a mooring" programs have been successful in some countries where local businesses and civic groups have raised money to establish individual mooring sites.

4.2 Manage and Protect all Life Stages

4.21 Review existing local laws and regulations

The first Ordinance to offer protection to sea turtles was the Turtles Ordinance of 1959. Young and breeding turtles of all species except the leatherback were protected during a closed season extending from 1 July to 31 August. The Ordinance made it an offence to take or possess turtles or turtle eggs (including leatherback eggs) during the closed season, or to take turtles below 20 pounds in weight at any time. The Ordinance established the offender liable to a fine not exceeding \$100 and provided for the confiscation of any turtle products or fishing equipment. Upon conviction, the magistrate could order that a part of any fine imposed not exceeding 50% be paid to any person whose information led to the conviction.

In 1986, the Turtles Ordinance was amended to include the protection of leatherback turtles. In addition, the closed season was extended from 1 April to 30 November. During these eight months, it is unlawful to catch or take any turtle, to slaughter, sell, or possess any turtle or turtle product, or to take the eggs of any turtle species. The remaining restrictions in the 1959 law, namely the size limit and the penalties, stand as before.

All BVI beaches are protected under the Beach Protection Ordinance (1988). This Ordinance prohibits the removal of natural sea barriers or sand, stone, or gravel foreshore except through the permission of the Minister (made by application). It prohibits under any circumstances removal that is likely to

result in shoreline erosion. The Ordinance permits the carrying away of quantities of sand small enough to be removed without an animal or a wheeled vehicle (including wheel barrows). It prohibits the fouling of the foreshore with garbage or any other debris and establishes penalties for violations.

4.22 Evaluate the effectiveness of law enforcement

Currently, the enforcement of environmental legislation is less than adequate. Officers lack specific training in environmental laws (section 3.4) and there is a general indifference on the part of the public/judiciary with respect to environmental law enforcement. Enforcement could be made more effective by the active recruiting of information from local residents. Citizen reports are few, yet the Police Commissioner has offered that any citizen wishing to report the violation of a conservation law should contact him directly and he will personally see that it is properly addressed. This kind of attitude is to be applauded, and all citizens are urged to report legal violations of any sort. Violations against endangered species and habitats erode an irreplaceable national heritage that is unique to the BVI and belongs equally to all her people, present and future.

Current efforts by the Fisheries and Conservation Officers to regularly patrol BVI waters should force a stricter following of fisheries regulations on the part of the public.

4.23 Propose new regulations where needed

4.231 Eggs

The take of eggs should be prohibited at all times. Various estimates of the extent of the harvest exist. Fletemeyer (1981) estimates it close to 50%. Winston Leonard concedes that historically it was probably close to 100% in some areas; the target was primarily hawksbill. The harvest is opportunistic for personal consumption and undoubtedly remains high. Poaching is reported on Long Bay (Beef Island), Cam Bay and North Bay (Great Camanoe), North Beach (Guana Island), North Bay Beach and the West End beaches of Scrub Island, and all around Anegada. There is no export of eggs.

4.232 Nesting females

The recent extension of the closed season and the protection of leatherback turtles are both great strides forward in the effort to protect marine turtles in the BVI. However, because all three species nest during some part of the open season (December-March, inclusive), the next important step is to ban the take of turtles at all times. It is particularly critical that breeding females be allowed to safely nest. Fewer than 1% of the hatchlings that enter the sea will survive the many decades required to reach adulthood; the survival of these breeders is absolutely essential to the survival of a population. Nesting females are the most difficult thing for a population to replace. They should receive the most stringent protection.

4.233 Immatures

While the new closed season offers substantially greater protection to foraging juveniles that was previously afforded, primarily because fishing activity is greatly reduced during the winter months of December-March, it is important that foraging juveniles be protected throughout the year. This is

the case in the nearby United States Virgin Islands (USVI) and the discrepancies in protection between the two nations causes an endless array of problems for USVI enforcement officers.

First, it is difficult for USVI fishermen to refrain from killing turtles when they know that the turtles are killed as soon as they cross into British waters. Second, the open port on the east end of St. Thomas is an easy entrance point for turtles legally caught in British waters during open season but illegally imported into the USVI. Consequently, USVI enforcement personnel say that the British open season encourages fishermen in the USVI to break the law by illegally smuggling turtles into St. Thomas. Third, BVI fishermen illegally catch turtles in USVI waters and return safely across the border to legally market the turtles in the BVI. These facts point to the fundamental importance of consistency between nations when widely ranging endangered species are involved.

4.234 Unprotected species

All sea turtle species are protected under current Ordinances.

4.24 Augment existing law enforcement efforts

As the situation now stands, the Fisheries, National Parks Trust, Public Health, and Marine Ordinances (as well as the proposed Coastal Conservation Act) all have provisions for their respective Ministers to deputize Officers within the Ministry (or hire enforcement personnel) to enforce the Ordinance. Unfortunately, these options are rarely exercised; consequently, little enforcement outside of the routine enforcement offered by the Police takes place. It was suggested by several parties that a law enforcement division be created to concentrate on environmental law in general so that there is some administrative continuity and the most efficient use of training, time and equipment can be established. In the meantime, Fisheries and Conservation Officers should have full powers of enforcement (only the Fisheries Officer is currently deputized).

Commercial dive operators and fishermen should be encouraged to support formal law enforcement efforts. Both groups are in unique positions to monitor offshore damage to habitat, report out-of-season catches, and exert peer pressure to prevent violations. The owners of residential and commercial beach-front property should also be enlisted to report sea turtles caught (or eggs collected) out of season, and any incidences of degradation to the coastal environment (careless mooring, at-sea-dumping, reef destruction, sand mining, vehicles on nesting beaches).

There have been preliminary discussions with the members of fishing cooperatives in hopes of initiating mechanisms for the regulation of fishermen by fishermen, but commitments are yet to materialize. There has, however, been strong support from some local residents, beach-front hotel owners, and dive operators to carefully monitor areas that they use or observe frequently.

4.25 Male fines commensurate with product value

Is the maximum fine for violating the Turtle Ordinance is \$100 and the forfeiture of equipment used (section 4.21). There is interest within the

Ministry of Natural Resources to raise the fine by amending the Ordinance. This will undoubtedly be necessary if it turns out that the newly extended closed season is widely ignored.

4.26 Investigate alternative livelihoods

This is not of great concern to the fishermen of the BVI, for the general consensus is that no one really makes a living from sea turtles. While there is some directed catch (mostly seine nets, some spearing), the majority of turtles landed are brought in incidentally to other fishing operations.

The 'trunk fishery' currently involves a small group of men who still watch the nesting beaches at regular intervals to obtain adult leatherbacks (sections I, 2.3). Fewer than six leatherbacks have been killed per annum over the last decade, reportedly a significant decline (apparently reflecting a serious decline in nesters) from former years. The revenue generated is divided among the trunk fishermen and is not presently a primary source of income.

4.27 Promote the use of the TED, or similar methodologies

There is no local or foreign shrimping in the BVI and thus commercial trawling poses no threat to the continued survival of sea turtle stocks. TEDs ('Turtle Excluder Devices', or 'Trawler Efficiency Devices' as they are sometimes called) are not needed. Long line vessels do, however, unintentionally hook leatherback turtles (section 2.3) and this situation deserves further study. No mortality has yet been reported.

4.28 Supplement reduced populations using management techniques

There are no data as yet to enable personnel within the Ministry of Natural Resources to evaluate the costs and benefits of specific management options. Major foraging and nesting habitats are yet to be systematically quantified. When these areas are identified, it may be sufficient (in conjunction with the elimination of harvest) to simply protect these areas from adverse development. Should the adoption of more elaborate strategies, such as tagging programs or the maintenance of an egg hatchery, be deemed desirable, methodology should follow that described in the Manual of Sea Turtle Research and Conservation Techniques (Pritchard et al., 1983).

4.29 Monitor stocks

4.291 Nests

A program to evaluate and monitor nesting beaches has been initiated by the BVI Ministry of Natural Resources and the National Parks Trust. It is hoped that interested members of the public will volunteer to survey selected beaches and that eventually funds will be available to pay student interns to more closely monitor the success of nests laid on the most important nesting beaches.

It is imperative that nests be monitored on a regular basis so that increasing or decreasing population trends can be documented. Any successful management program must be based upon accurate estimates of productivity (the number of nests laid) and mortality (losses due to erosion, feral animals, crabs, birds, mongoose, poachers, etc.).

4.292 Hatchlings

Similarly, it is hoped that volunteers will monitor hatching success on key beaches and report successes and causes of mortality (beach debris, vegetation entanglement, artificial lighting, feral animals, crabs, birds, mongoose, etc.).

4.293 Immatures and adults

The monitoring of juvenile and adult turtles requires special preparation and can be much more difficult than counting nests or evaluating hatchling mortality. In order to monitor foraging juveniles, systematic surveys to specific foraging grounds must be undertaken. If such survey work is undertaken in conjunction with a tagging program, it is possible to evaluate both the foraging periodicities of individuals and their movements (should a tagged turtle turn up at some point distant from where it was tagged, for instance). It is not necessary, however, to tag individuals and valuable information can be garnered by repeated observation of foraging areas and reporting the number of turtles seen.

In order to monitor the number of nesting adult turtles, it is necessary to monitor a beach consistently enough so that one knows exactly how many nests are laid (and by what species) per night. Using this information and the known nesting periodicities of the various species, one can fairly accurately estimate the number of nesting females by the number of nests laid. Systematic morning nest counts are essential for this kind of estimation, as is the accurate assessment of whether or not eggs were actually deposited (a turtle sometimes comes ashore and returns to the sea before successfully nesting).

If one wishes to become even more specific about the number of females nesting on a particular beach, as well as the return intervals both within and between seasons by individuals, then all-night patrol must be undertaken by trained personnel and the tagging of nesting females initiated. Tagging is not something to be undertaken lightly. It is time-consuming and can be expensive. Most importantly, one does not learn much about population dynamics from tagging for a year or two. One must be willing to enter into a long term research commitment (whereby females are consistently tagged for a decade or more) in order to learn anything that is not learned from daily nest counts.

4.3 Encourage and Support International Legislation

4.31 Encourage non-signatories to join CITES

The United Kingdom is party to CITES and the BVI enacted it in legislation as the Endangered Animals and Plants Ordinance of 1976. Any article that does not have proof of legal importation is liable to forfeiture under the Customs Ordinance (1975). The problem is that Customs Officers are not adequately trained to recognize endangered species (or products) and checks do not occur.

4.32 Encourage states to cooperate through other conventions such as the Western Hemisphere or Migratory Species Convention

What is the status of the BVI re: Bonn Convention on the Protection of Migratory Species of Wild Animals?

4.33 Establish subgroups in consultation with the IUCN/SSC Marine Turtle Specialist Group

4.34 Encourage states with common stocks of turtles to develop agreements for their management

The USVI and the BVI should be encouraged to bilaterally protect their joint populations of sea turtles (section 4.233). Inconsistencies between the statutes of the two nations have resulted in considerable enforcement difficulties.

4.35 Ask groups such as IUCN and WWF to provide support and legal expertise to implement above steps

Barbara Lausche (Natural Resources Lawyer, World Wildlife Fund) is assisting the BVI government in drafting a Coastal Conservation Act and a Nature Conservation Act (section 4.121). These Acts, should they be adopted, will provide an excellent basis for integrating conservation and development in the BVI.

4.4 Develop Public Education

4.41 Local residents

Several excellent environmental awareness programs are available to the local school system by the BVI Ministry of Natural Resources and the National Parks Trust. There is an introductory course in Environmental Awareness available to all elementary schools and natural resource slide shows are commonly presented to High School students. One such slide program describes mangrove, beach, salt pond, and hill forest ecosystems; the program is followed by an appropriate field trip. Another slide program specifically discusses sea turtles. These programs currently serve only the island of Tortola and high priority should be placed on expanding them to Virgin Gorda.

In addition to educational programs in the schools, field trips to National Park sites are led on request by personnel from the National Parks Trust. Media attention to environmental issues has included newspaper articles (including a regular column in the 'Island Sun'), radio interviews, and films. A locally produced film entitled "Island Web" explains the natural and cultural history of the British Virgin Islands and cautions over-zealous development. The National Parks Trust distributes a regular newsletter devoted to natural history topics.

While there are no natural history or conservation groups in the BVI, there is certainly potential for such groups as the Botanic Society, Friends of the National Parks Trust, East End/Long Look Action Committee, Historical Society, Lion's Club, Rotary, Dive Operators Association and others to become actively involved in conservation issues. Public meetings (e.g., church and civic groups) are ideal as forums for environmental awareness presentations.

4.42 Tourists

No organized education toward tourists exists, except that offered by popular sites such as the "Wreck of the Rhone". It is imperative that visitors be made more aware of the adverse environmental effects of such activities as

indiscriminate mooring, garbage disposal, spear-fishing, and collecting (e.g. corals, sponges, plants). Tourism is a significant source of income for the BVI; it would be ironic if tourists were allowed to destroy the very resources that attracted them to the area in the first place.

Charter operations, divers, and hotel owners should make it a point to have materials available to tourists concerning the legality of such activities as those just listed and to report any violations. Entities such as the BVI Ministry of Natural Resources and the National Parks Trust should provide the necessary materials.

4.43 Fishermen (e.g., preventing incidental catch)

There are no formal education programs for fishermen at the present time, but contact between the Fishermen's Association and the Ministry of Natural Resources is well established and all members of the fishing community are aware of laws protecting sea turtles.

4.44 Non-consumptive use of sea turtles to generate revenue (e.g., natural history expeditions to parks)

A number of Marine Parks and Protected Areas are currently planned in the BVI and some turtle nesting sites are included (e.g., Anegada, Sandy Cay). It is possible that regular sea turtles programs could be initiated in these areas to enable the public, for a fee, to engage in "turtle watching". Proceeds could augment existing funds for Park management and interpretive materials.

4.5 Increase Information Exchange

4.51 Marine Turtle Newsletter

4.52 WATS II

4.53 WIDECAST

4.54 Caribbean Newsletter

4.55 Distribute WATS Manual

4.56 Workshops on research and management (after WATS Manual)

4.57 Exchange of information among interested local groups

V. References

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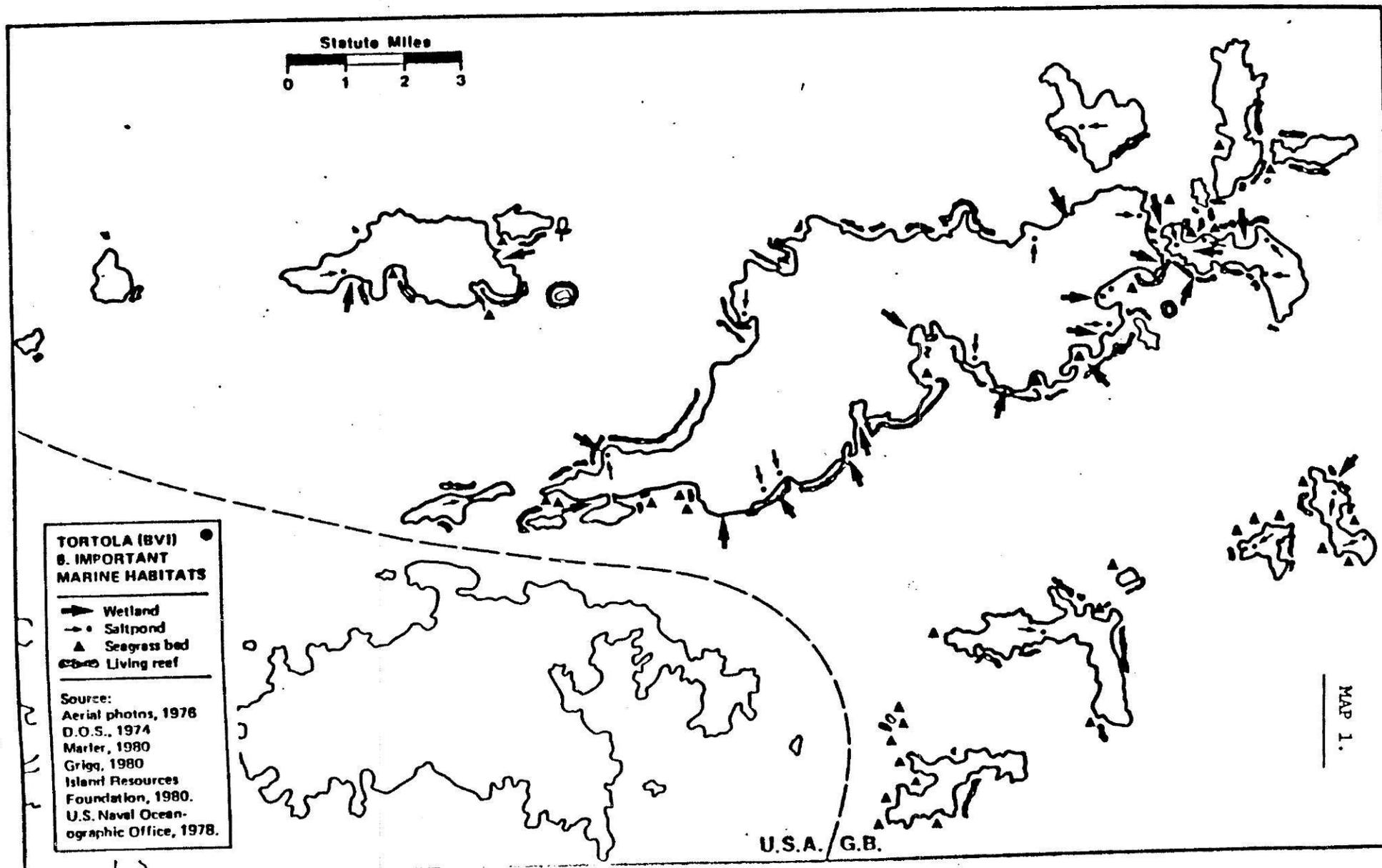
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MAPS

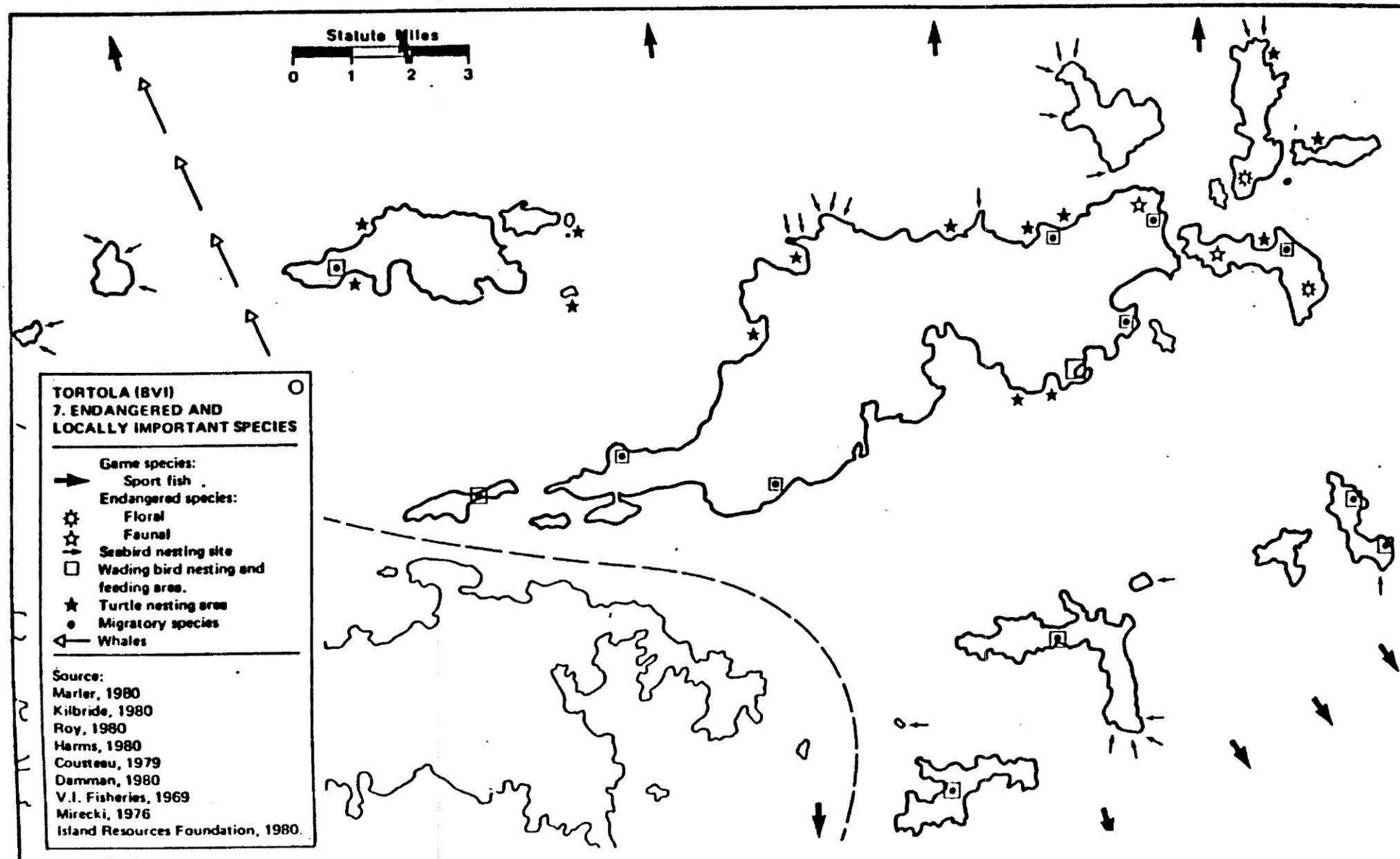
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2. Seagrass and reef habitats around Virgin Gorda, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles, Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
3. Seagrass and reef habitats around Anegada, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles, Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
4. Sea turtle nesting areas on the island of Tortola, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles, Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
5. Sea turtle nesting areas on the island of Virgin Gorda, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles, Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.
6. Sea turtle nesting areas on the island of Anegada, British Virgin Islands. Preliminary Data Atlas, Survey of Conservation Priorities in the Lesser Antilles, Eastern Caribbean Natural Areas Management Program (ECNAMP), 1980.

Eastern Caribbean Natural Area Management Program • Survey of Conservation Priorities in the Lesser Antilles

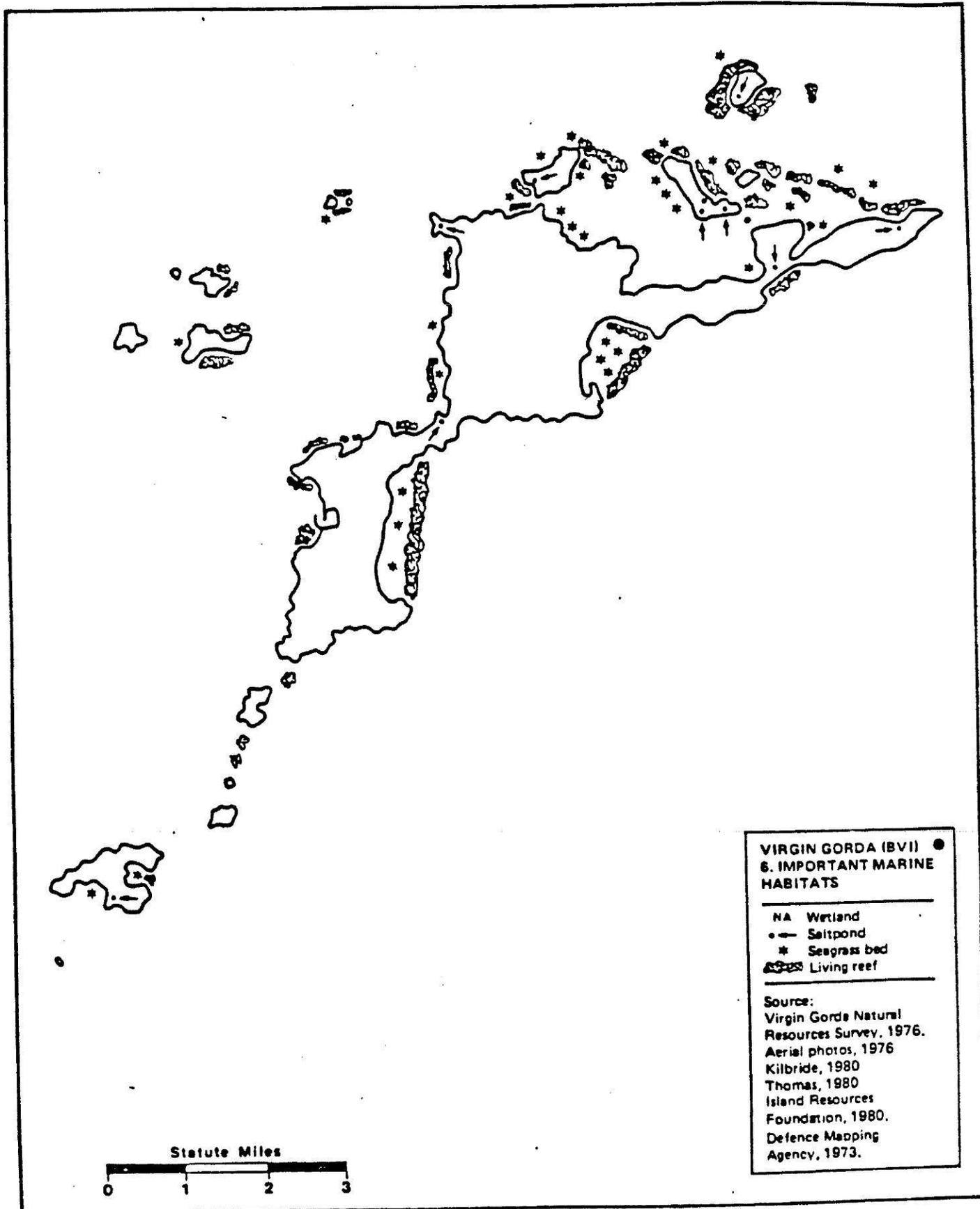
RESOURCE DATA MAPS • TORTOLA (BRITISH VIRGIN ISLANDS)



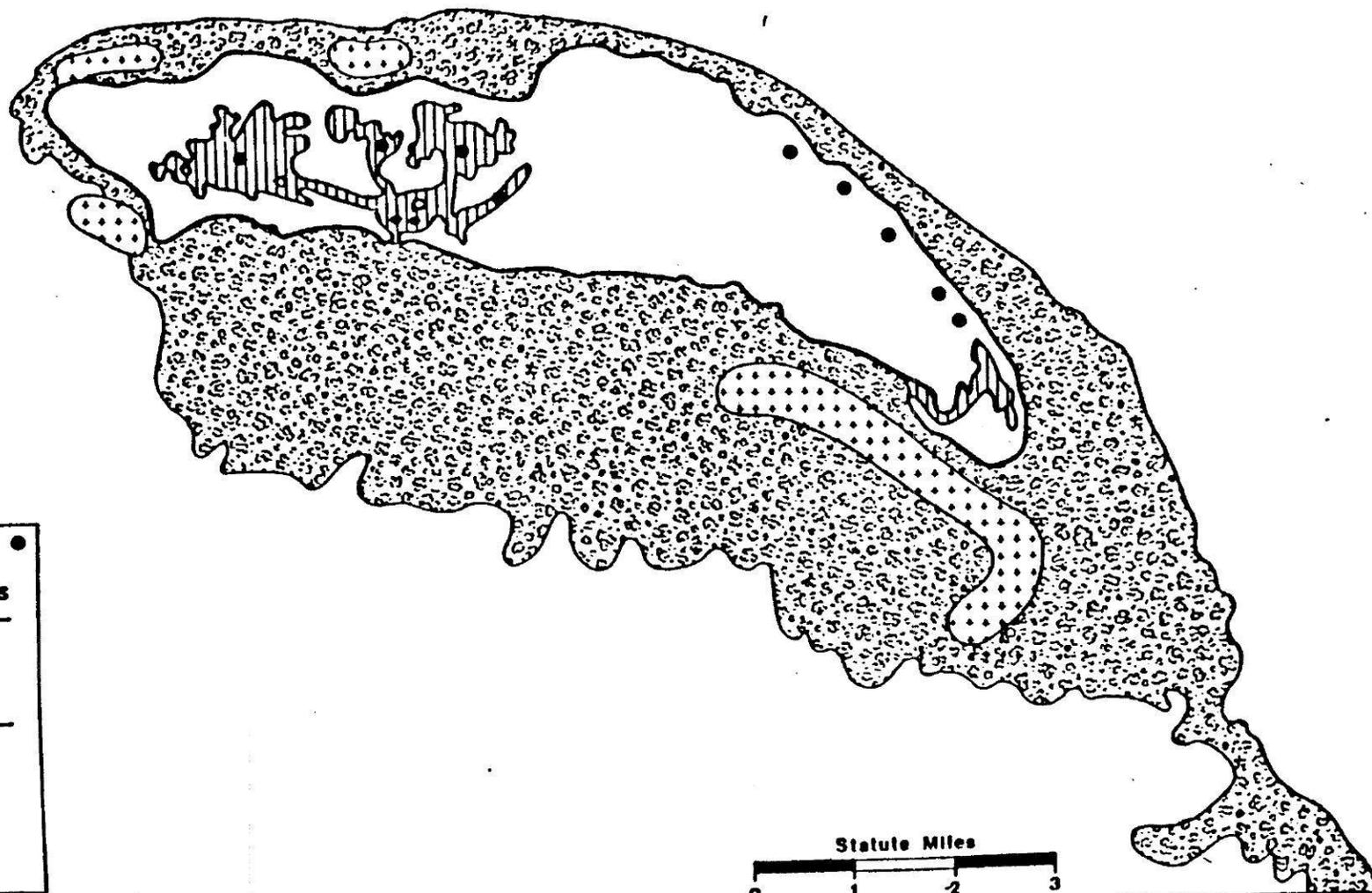
RESOURCE DATA MAPS • TORTOLA (BRITISH VIRGIN ISLANDS)



RESOURCE DATA MAPS • VIRGIN GORDA (BRITISH VIRGIN ISLANDS)



RESOURCE DATA MAPS • ANEGADA (BRITISH VIRGIN ISLANDS)



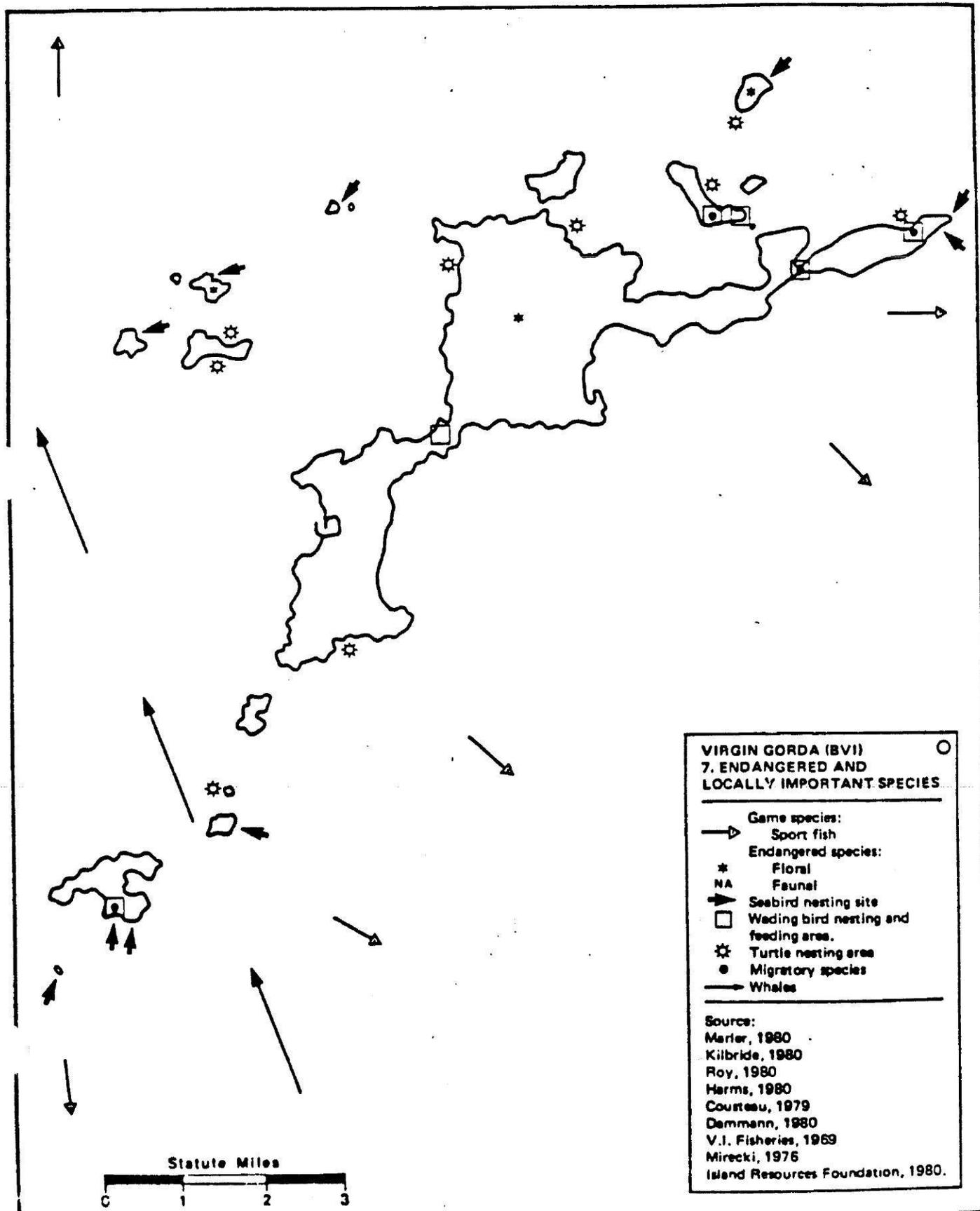
ANEGADA (BVI) ●
**6. IMPORTANT
MARINE HABITATS**

- ▨ Wetland
- Saltpond
- ▨ Seagrass bed
- ▨ Living reef

Source:
Aerial photos, 1976
Howard, 1970
Dunne, 1975
Freeman, 1980
Island Resources
Foundation, 1980.

Statute Miles
0 1 2 3

RESOURCE DATA MAPS • VIRGIN GORDA (BRITISH VIRGIN ISLANDS)



RESOURCE DATA MAPS • ANEGADA (BRITISH VIRGIN ISLANDS)

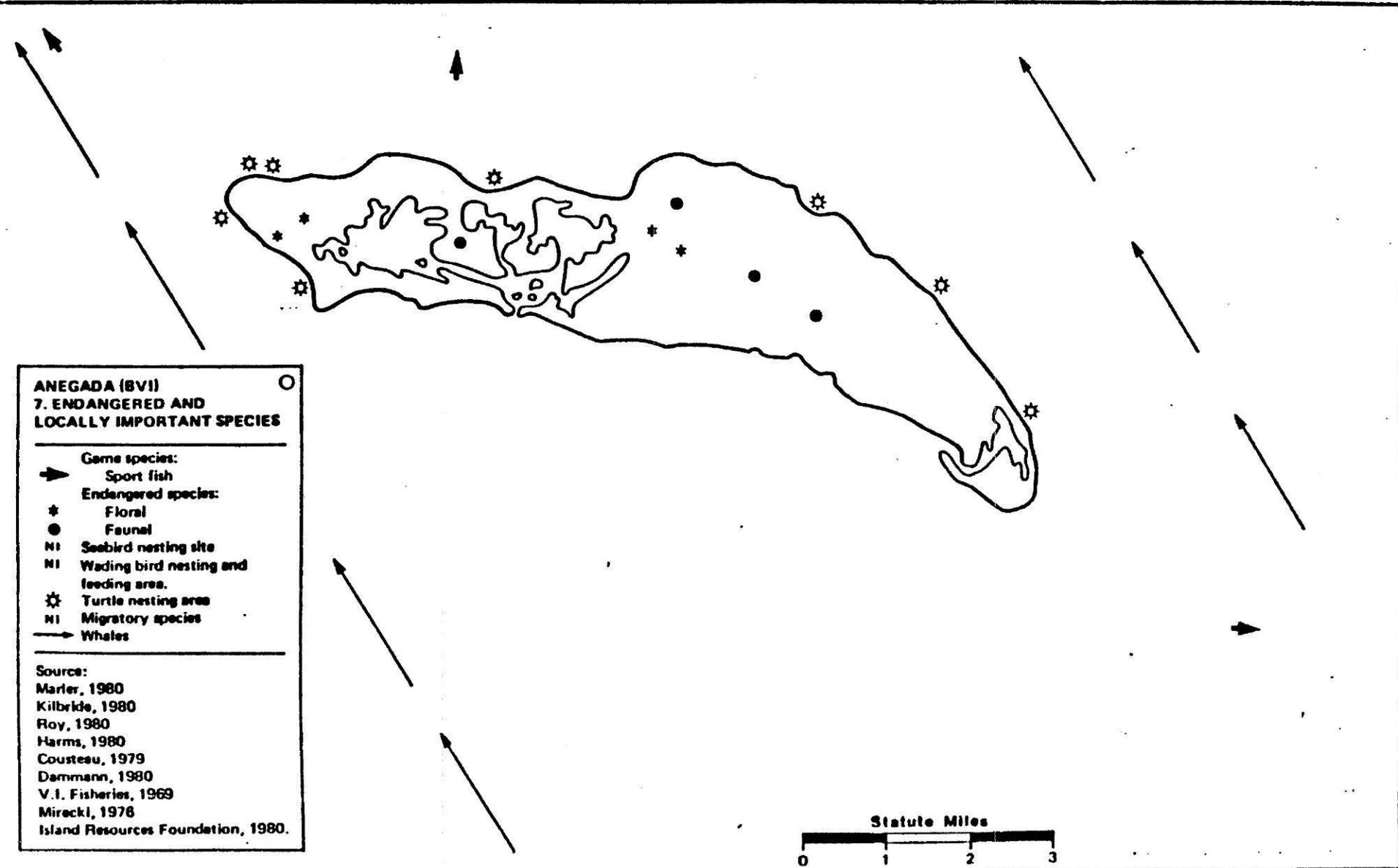


TABLE 1. in preparation.

Records of green, hawksbill, and leatherback
sea turtles foraging in the waters of the
British Virgin Islands.

TABLE 2. Records of Green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), and Leatherback (*Dermochelys coriacea*) sea turtles nesting on beaches in the British Virgin Islands, West Indies. Species abbreviations are C.m., E.i., and D.c., respectively. When a species is listed in parentheses, it is suspected to nest but has not actually been observed. "[C.m./E.i.]" indicates that the species in question is definitely not Leatherback. A question mark in parentheses indicates that the species is unknown entirely. "WATS I" = Fletemeyer's (1981) BVI National Report for the Western Atlantic Turtle Symposium, Costa Rica, 1983. "ECNAMP" = Resource Data Maps (specifically, "Endangered and Locally Important Species"), Eastern Caribbean Natural Areas Management Program (1980).

ANEGADA

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Pomato Pt/ W End	3.2	C.m.,E.i. D.c.	WATS I (aerial survey, ECNAMP) residents
W End/ Cow Wreck	3.4	E.i.	WATS I (aerial survey)
Cow Wreck/ Windlass	3.5	[C.m./E.i.]	WATS I (ECNAMP)
Windlass/ Soldier Pt	3.0	C.m.,E.i.	WATS I (fishermen)
Soldier Pt/ Loblolly Pt	3.4	[C.m./E.i.]	WATS I (ECNAMP)
Loblolly Pt/ East Pt	6.9	C.m.,E.i.	WATS I (aerial survey, fishermen. ECNAMP)

note: E.i. "along most of the north coast" Winston Leonard

BEEF ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Well Bay	0.2	(C.m.) E.i.	WATS I (fishermen) WATS I (fishermen)
Bluff Bay	--	E.i.	B. Lettsome, N. Clarke
Long Bay	0.4	C.m.,E.i. E.i. D.c.	WATS I (aerial survey, ECNAMP) M. Doran (hatch report 1/86) T. Davies (hatch report 3/87) B. Lettsome
Little (=Trellis) Bay	0.3	(C.m.) E.i.	WATS I (source unknown) WATS I (aerial survey)

BUCK ISLAND

No beaches suitable for nesting.
Two beaches (West Beach, North Beach),
but no information

WATS I
B. Lettsome

COCKROACH ISLAND

No beaches suitable for nesting.

WATS I

COOPER ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Manchioneel	0.7	(C.m.) (E.i.)	WATS I (fishermen) WATS I (fishermen)
Coral Bay Beach	--	E.i.	W. Leonard
Hallovers Pond Beach	0.9	[C.m./E.i.]	WATS I (ECNAMP)

DEAD CHEST ISLAND

No beaches suitable for nesting.

WATS I

EUSTATIA

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
North End Beach	0.6	(?)	WATS I (source unknown)

FALLEN JERUSALEM

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
North Lee Bay Beach	0.1	E.i.	W. Leonard

FRENCHMANS CAY

No beaches suitable for nesting.

B. Lettsome

GEORGE DOG

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Crabbe Hill Beach	0.2	(?)	WATS I

GINGER ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
South Bay	0.4	(?)	WATS I
Wedego Bay	0.2	(?)	WATS I
The Sound Beach	0.3	E.i.	W. Leonard

GREAT CAMANOE

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Cam Bay	0.4	[C.m./E.i.]	WATS I (fishermen)
Low Bay	0.2	(?)	WATS I
Lee Bay	0.3	(?)	WATS I
North Bay	0.4	[C.m./E.i.] E.i.	ECNAMP B. Lettsome

GREAT DOG

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
North Bay	0.4	[C.m./E.i.]	ECNAMP
South Bay	0.5	[C.m./E.i.]	ECNAMP

GREAT TOBAGO

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Camp Bay	0.1	(C.m.) E.i.	WATS I (fishermen) WATS I (fishermen)

GREAT THATCH ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
The Hollow Beach	0.5	(C.m.) E.i.	WATS I (source unknown) WATS I (source unknown)

GREEN CAY

No beaches suitable for nesting. WATS I

GUANA ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
White Bay Beach	0.6	[C.m./E.i.]	WATS I, residents
Muskmelon Bay Beach	0.5	[C.m./E.i.]	WATS I (fishermen)
North Beach	0.9	[C.m./E.i.]	residents

JOST VAN DYKE

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Saddle Bay	0.2	(?)	WATS I
White Bay	0.6	C.m.	WATS I (aerial survey)
Upper Dog Hole	0.4	(?)	WATS I
Great Harbour Beach	0.3	[C.m./E.i.]	ECNAMP
Garnier Bay	0.2	(?)	WATS I
East End Beach	0.2	(?)	WATS I
Long Bay	0.6	(?)	WATS I
North Side Bay	0.3	(?)	WATS I

LITTLE CAMANOE

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
East End/ South Bay	--	C.m. (E.i.)	WATS I (aerial survey) WATS I (aerial survey)

LITTLE JOST VAN DYKE

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Crawl Beach	--	[C.m./E.i.]	B. Lettsome

LITTLE THATCH ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Northwest coast	--	E.i.	B. Selzer

LITTLE TOBAGO

No beaches suitable for nesting. WATS I

MOSQUITO ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Manchioneel	0.4	[C.m./E.i.]	WATS I (fisherman)

NECKER ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Devil Hill Bay	0.4	[C.m./E.i.]	WATS I (fishermen, ECNAMP). Sigma Env. Sci., 1980
West End Beach	--	C.m. (E.i.)	WATS I (aerial survey) WATS I (aerial survey)

NORMAN ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Buff Bay Beach	0.7	[C.m./E.i.]	WATS I (fishermen, ECNAMP)

PELICAN CAY

No beaches suitable for nesting. WATS I

PETER ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Little Reef Bay Beach	0.3	(?) (E.i.)	WATS I (source unknown) B. Lettsome
Big Reef Bay Beach	--	(E.i.)	B. Lettsome
Deadman Bay	0.8	[C.m./E.i.] D.c.	WATS I (fishermen, divers) Resource magazine (Oct/Dec 1985), nester killed
Sprat Bay Beach	0.6	(?)	WATS I
Rock Hole/ Rogers Pt	--	(E.i.)	B. Lettsome
West of Key Pt	--	(E.i.)	B. Lettsome
White Bay Beach	--	(E.i.)	B. Lettsome
Sand Pierre Bay	0.6	[C.m./E.i.]	ECNAMP
Stoney Bay Beach	0.9	(?)	WATS I

PRICKLY PEAR ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Countra Pt/ Asbestos Pt	1.6	[C.m./E.i.]	WATS I (fishermen, ECNAMP)
Bandy Point Beach (=Prickly Bay Beach)	1.4	[C.m./E.i.]	WATS I (fishermen)
Vixen Point Beach	0.9	(?)	WATS I

ROUND ROCK

No beaches suitable for nesting.

WATS I

SANDY CAY

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Sandy Cay Beach	0.7	C.m., E.i. D.c.	WATS I (aerial survey) B. Lettsome, N. Clarke

SANDY SPIT

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Sandy Spit Beach	0.05	C.m.,E.i.	WATS I (aerial survey)

SALT ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
South Bay Beach	0.3	(?)	WATS I
Salt Island Bay	0.2	(?)	WATS I
Sound Beach	0.3	E.i.	W. Leonard

SCRUB ISLAND

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
East South Bay	0.2	(?)	WATS I
North Bay Beach	0.3	[C.m./E.i.]	ECNAMP
West End beaches	--	E.i.	W. Robinson
(location unknown)	--	E.i.	WATS I (aerial survey)

SEAL DOG ISLANDS

No beaches suitable for nesting.

WATS I

TORTOLA

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
Sandy Point Beach	0.2	(?)	WATS I
Sea Cow Bay Beach	0.5	(?)	WATS I
Sophie Bay Beach	--	[C.m./E.i.] C.m.	ECNAMP G. Blok (hatch 6/84), L. Blok (adults nesting)
Brandywine Beach	0.6	[C.m./E.i.] E.i.	WATS I (fishermen, ECNAMP) B. Lettsome
Halfmoon Bay Beach	0.8	[C.m./E.i.]	residents

Hodges Bay Beach Lettsome (=Money Bay/Bar Bay)	0.8	[C.m./E.i.]	WATS I (fishermen), B.
Fat Hogs Bay 1982)	--	D.c.	fishermen (nester killed.
Lloyds Beach (=Hawk's Nest)	--	E.i.	B. Lettsome
Little Bay, Lambert	0.5	C.m. E.i.,D.c.	WATS I (aerial survey) WATS I (source unknown)
Long Bay, Lambert	1.4	C.m.,E.i. D.c.	WATS I (ECNAMP) B. Lettsome/N. Clarke (crawls 4/87, 5/87), nester killed 5/86
Josiahs Bay Beach	0.9	C.m.,E.i. D.c.	WATS I (ECNAMP) B. Lettsome; Dr. K. Pickering (4/87, 6/87)
Rogues Beach	--	D.c.	B. Lettsome/N. Clarke (2 crawls, 5/87)
Trunk Bay Beach	0.8	D.c.	B. Lettsome/N. Clarke (crawls 4/87, 5/87)
Cooper Bay Beach	0.7	[C.m./E.i.]	WATS I (fishermen)
Larmer's Bay Beach	1.2	C.m.,E.i.	WATS I
Brewer's Bay Beach	--	E.i.	N. Clarke (hatch report 1/85)
Cane Garden Bay Beach	1.8	[C.m./E.i.]	WATS I (ECNAMP)
Capoons Beach	--	[C.m./E.i.]	B. Lettsome
Long Bay/ Belmont Bay	2.2	(?)	WATS I
Smuggler's Cove Beach	--	C.m.,E.i.	C. Arneborg

VIRGIN GORDA

<u>Beach</u>	<u>length</u>	<u>species</u>	<u>source</u>
St. Thomas Bay	1.3	C.m., (E.i.)	WATS I (aerial survey)
Savannah Bay	1.1	(?)	WATS I
Teton/ Mt. Trunk Bay	1.0	D.c.	WATS I (fishermen)
Biras Hill Beach	0.3	(?)	WATS I
Crooks Bay Beach	1.1	[C.m./E.i.]	ECNAMP
Long Bay/ Mt. Point	--	[C.m./E.i.]	ECNAMP
Little Trunk Bay	--	[C.m./E.i.]	ECNAMP
Oil Nut Bay	--	[C.m./E.i.]	ECNAMP

WEST DOG ISLAND

No beaches suitable for nesting.

WATS I

QUESTIONNAIRE

Caribbean Trade in Sea Turtle Products

The Wider Caribbean Sea Turtle Conservation Network (WIDECAST) urgently requests your involvement in a fact finding mission. The biennial meeting of Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) will take place in Ottawa, Canada, 12-25 July 1987. Delegates representing nations from around the world will be asked to make decisions on the acceptability of proposals for international trade in sea turtle products, relative to the endangered status of the sea turtles involved. Those same delegates need to hear from you. The Caribbean community must be heard on matters of international trade in endangered species that are essential to the Caribbean way of life.

The enclosed questionnaire deals with Caribbean trade in sea turtle products. Your comments will be used by the Director General of WIDECAST to prepare an informational document for CITES delegates. The document will provide an analysis of existing Caribbean trade in sea turtle products, based on the best data available in time for the CITES meeting. It will also present the range of opinions expressed by you, the participants of the WIDECAST network, and by other concerned individuals on a variety of topics dealing with trade and conservation of sea turtles.

The completed document on Caribbean trade in sea turtle products will be made available to all CITES delegates by April, well before the July meeting in Ottawa. All who have participated in the preparation of the document by completing the enclosed questionnaire will also receive a copy, but your comments should be received not later than February 20, 1987 to ensure that you are included in the final draft. WIDECAST would like to append to the completed document a list of contributors and addresses in order to stimulate the exchange of views and information among the participants of the WIDECAST network. However, should you request anonymity for your answers or your participation in the preparation of the document, your wishes will be strictly honored. Please indicate your preference at the bottom of this page.

Name: BERTRAND LETTSOME

Mailing Address: CONSERVATION OFFICER MINISTRY OF NATURAL RESOURCES
ROAD TOWN TORTOLA BRITISH VIRGIN ISLANDS

Profession: MARINE BIOLOGIST Phone: 809-49-43701 or 43904

Country for which you are supplying information: BRITISH VIRGIN ISLANDS

If you are providing information for a particular area or district within a country and not the entire country, please denote the area to which your information pertains: _____

I request that my participation in this questionnaire remain anonymous

I request that my answers in this questionnaire remain confidential

Please air mail completed questionnaires to:

Dr. James I. Richardson, Director General
WIDECAST
Institute of Ecology
University of Georgia
Athens, Georgia 30602, USA

1
MARKET SURVEY

There is an active legal commerce in sea turtle products within much of the Wider Caribbean and throughout the world. Many individuals and governments believe that national and international commerce in sea turtles must be strictly regulated before dwindling turtle populations can recover. A detailed accounting of national and international trade in sea turtle products must be made available to all governments if cooperative programs for the recovery and management of sea turtle populations are to be realized. This MARKET SURVEY is designed to gather general information for 1987 CITES delegates. The information you provide is very important to the overall success of the survey.

RAW HAWKSBILL TORTOISESHELL (Unprocessed)

Also called hawksbill shell, hawksbill scales, bakko

Eretmochelys imbricata (E.I.) - hawksbill, carey, caret, oxbill

1. Is raw hawksbill tortoiseshell harvested legally within your country?

Yes No Not sure

If YES, please complete questions a through d.

a) Most of the hawksbills are taken by: (Please circle answer.)

Commercial sea turtle fishermen

Always **Sometimes** Rarely Never

Commercial fishermen who take sea turtles incidental to other fishing activities

Always **Sometimes** Rarely Never

Recreational divers

Always **Sometimes** Rarely Never

People who patrol beaches to capture nesting female sea turtles

Always Sometimes **Rarely** Never

Young people looking for spending money

Always Sometimes Rarely **Never**

Other (please specify) _____

Always Sometimes Rarely Never

b) Can you estimate the number of individual hawksbill turtles harvested or the amount (weight) of raw hawksbill tortoiseshell collected within your country each year?

Number of Animals

Amount of Tortoiseshell

- 1 - 10
- 10 - 100
- 100 - 1,000
- more than 1,000

- 1 - 10 kilos
- 10 - 100 kilos
- 100 - 1,000 kilos
- more than 1,000 kilos

c) Do the same people who capture hawksbills also:

I. manufacture tortoiseshell products to sell?

Yes ___ No Not sure ___

II. export raw tortoiseshell to other countries?

Yes ___ No Not sure ___

III. sell tortoiseshell to other individuals or companies within your country?

Yes No ___ Not sure ___

d) Can you estimate the price in local currency for:

-an individual hawksbill turtle \$1.75 per POUND U.S. Currency

-a kilo of raw hawksbill tortoiseshell _____

2. Is hawksbill tortoiseshell imported into your country?

Yes ___ No Not sure ___

If YES, please complete questions a through c.

a) The individuals importing most of the raw hawksbill tortoiseshell into your country are:

	Always	Sometimes	Rarely	Never
Foreign dealers				
Local buyers				
Local fishermen returning from foreign waters				
Foreign fishermen				
Other individuals (please specify)				

b) From which countries do you think most of the imported hawksbill tortoiseshell is coming?

c) Can you estimate the quantity (weight) of raw tortoiseshell or the numbers of hawksbill carapaces which are imported each year?

Number of Animals	Amount of Tortoiseshell
1 - 10	1 - 10 kilos
10 - 100	10 - 100 kilos
100 - 1,000	100 - 1,000 kilos
more than 1,000	more than 1,000 kilos

3. Is hawksbill tortoiseshell commercially exported to other countries?

Yes No Unknown

If YES, please complete questions a through d.

a) The individuals exporting most of your hawksbill shell to other countries are:

Foreign buyers

Always Sometimes Rarely Never

Local buyers

Always Sometimes Rarely Never

Foreign fishermen departing your territorial waters with locally caught turtles

Always Sometimes Rarely Never

Local fishermen taking locally caught turtles for sale in other countries

Always Sometimes Rarely Never

Other (please specify) _____

Always Sometimes Rarely Never

b) To which countries do you think your hawksbill tortoiseshell is being exported?

c) From which countries do the foreign buyers come?

d) Can you estimate the quantity (weight) of tortoiseshell or the numbers of hawksbill carapaces which are exported to other countries each year?

Number of Animals

1 - 10

10 - 100

100 - 1,000

more than 1,000

Amount of Tortoiseshell

1 - 10 kilos

10 - 100 kilos

100 - 1,000 kilos

more than 1,000 kilos

MARKET SURVEY

Eretmochelys imbricata (E.I.) - hawksbill, Carey, Caret, Oxbill

Please check appropriate line: Yes ___ No ___ Unsure ___

Please respond by placing the appropriate number in each space:
 (1) Always, (2) Sometimes, (3) Rarely, (4) Never

Market Item	Manufactured In Country	Foreign Imports	Exports	Where Sold Locally	Type of Store	Buyer
Carapace	Yes <input checked="" type="checkbox"/> No ___ Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Major cities <input checked="" type="checkbox"/> Small cities <input checked="" type="checkbox"/> Rural areas <input checked="" type="checkbox"/>	Hotel <u>2</u> Airport <u>2</u> Gift <u>2</u> Department <u>2</u> Street vendor <u>2</u> Marketplace <u>2</u>	Local resident <u>2</u> Foreign tourist <u>2</u> National tourist <u>2</u>
Stuffed	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Major cities ___ Small cities ___ Rural areas ___	Hotel ___ Airport ___ Gift ___ Department ___ Street vendor ___ Marketplace ___	Local resident ___ Foreign tourist ___ National tourist ___
Whole Turtles or Mounted Heads	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Major cities ___ Small cities ___ Rural areas ___	Hotel ___ Airport ___ Gift ___ Department ___ Street vendor ___ Marketplace ___	Local resident ___ Foreign tourist ___ National tourist ___
Sea Turtle Skins (Raw) or Finished Leather	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Major cities ___ Small cities ___ Rural areas ___	Hotel ___ Airport ___ Gift ___ Department ___ Street vendor ___ Marketplace ___	Local resident ___ Foreign tourist ___ National tourist ___
Sea Turtle Creams, Lotions, or Cosmetics, or Medicines	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Yes ___ No <input checked="" type="checkbox"/> Unsure ___	Major cities ___ Small cities ___ Rural areas ___	Hotel ___ Airport ___ Gift ___ Department ___ Street vendor ___ Marketplace ___	Local resident ___ Foreign tourist ___ National tourist ___

Please be sure to fill in all spaces.

Eretmochelys Imbricata (E.I.) - hawksbill, carey, caret, oxbill (Continued)

Please check appropriate line: Yes __, No __, Unsure __				Please respond by placing the appropriate number in each space: (1) Always, (2) Sometimes, (3) Rarely, (4) Never		
Market Item	Manufactured in Country	Foreign Imports	Exports	Where Sold Locally*	Type of Store*	Buyer*
Raw or Frozen Sea Turtle Meat	Yes <input checked="" type="checkbox"/> No _____ Unsure _____	Yes _____ from where: _____ No <input checked="" type="checkbox"/> Unsure _____	Yes _____ to where: _____ No <input checked="" type="checkbox"/> Unsure _____	Major cities _____ Small cities <input checked="" type="checkbox"/> Rural areas <input checked="" type="checkbox"/>	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident <input checked="" type="checkbox"/> Foreign tourist _____ National tourist _____
Canned Sea Turtle Food Products	Yes _____ No <input checked="" type="checkbox"/> Unsure _____	Yes _____ from where: _____ No _____ Unsure _____	Yes _____ to where: _____ No _____ Unsure _____	Major cities _____ Small cities _____ Rural areas _____	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident _____ Foreign tourist _____ National tourist _____
Sea Turtle Eggs <i>DISTRIBUTED TO FRIENDS AND FAMILY</i>	Yes <input checked="" type="checkbox"/> No _____ Unsure _____	Yes _____ from where: _____ No <input checked="" type="checkbox"/> Unsure _____	Yes _____ to where: _____ No <input checked="" type="checkbox"/> Unsure _____	Major cities _____ Small cities _____ Rural areas <input checked="" type="checkbox"/>	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident <input checked="" type="checkbox"/> Foreign tourist _____ National tourist _____
Other Products (Deline) _____	Yes _____ No _____ Unsure _____	Yes _____ from where: _____ No _____ Unsure _____	Yes _____ to where: _____ No _____ Unsure _____	Major cities _____ Small cities _____ Rural areas _____	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident _____ Foreign tourist _____ National tourist _____

*Please be sure to fill in all spaces.

MARKET SURVEY

Chelonia mydas (C.m.) - green turtle, tortuga verde, tortue verte, greenback turtle

Please check appropriate line: Yes <input type="checkbox"/> , No <input type="checkbox"/> , Unsure <input type="checkbox"/>				Please respond by placing the appropriate number in each space: (1) Always, (2) Sometimes, (3) Rarely, (4) Never		
Market Item	Manufactured In Country	Foreign Imports	Exports	Where Sold Locally*	Type of Store*	Buyer*
Carapace Wall Hanging	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Major cities <input type="checkbox"/> Small cities <input checked="" type="checkbox"/> Rural areas <input checked="" type="checkbox"/>	Hotel <input type="checkbox"/> Airport <input checked="" type="checkbox"/> Gift <input checked="" type="checkbox"/> Department <input type="checkbox"/> Street vendor <input type="checkbox"/> Marketplace <input type="checkbox"/>	Local resident <input checked="" type="checkbox"/> Foreign tourist <input checked="" type="checkbox"/> National tourist <input type="checkbox"/>
Stuffed Whole Turtles or Mounted Heads	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Major cities <input type="checkbox"/> Small cities <input type="checkbox"/> Rural areas <input type="checkbox"/>	Hotel <input type="checkbox"/> Airport <input type="checkbox"/> Gift <input type="checkbox"/> Department <input type="checkbox"/> Street vendor <input type="checkbox"/> Marketplace <input type="checkbox"/>	Local resident <input type="checkbox"/> Foreign tourist <input type="checkbox"/> National tourist <input type="checkbox"/>
Sea Turtle Skins (Raw) or Finished Leather	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Major cities <input type="checkbox"/> Small cities <input type="checkbox"/> Rural areas <input type="checkbox"/>	Hotel <input type="checkbox"/> Airport <input type="checkbox"/> Gift <input type="checkbox"/> Department <input type="checkbox"/> Street vendor <input type="checkbox"/> Marketplace <input type="checkbox"/>	Local resident <input type="checkbox"/> Foreign tourist <input type="checkbox"/> National tourist <input type="checkbox"/>
Sea Turtle Creams, Lotions, Cosmetics, or Medicines	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Major cities <input type="checkbox"/> Small cities <input type="checkbox"/> Rural areas <input type="checkbox"/>	Hotel <input type="checkbox"/> Airport <input type="checkbox"/> Gift <input type="checkbox"/> Department <input type="checkbox"/> Street vendor <input type="checkbox"/> Marketplace <input type="checkbox"/>	Local resident <input type="checkbox"/> Foreign tourist <input type="checkbox"/> National tourist <input type="checkbox"/>

*Please be sure to fill in all spaces.

Chelonia mydas (C.m.) - green turtle, tortuga verde, tortue verte, greenback turtle (Continued)

Please check appropriate line: Yes <input type="checkbox"/> , No <input type="checkbox"/> , Unsure <input type="checkbox"/>				Please respond by placing the appropriate number in each space: (1) Always, (2) Sometimes, (3) Rarely, (4) Never		
Market Item	Manufactured In Country	Foreign Imports	Exports	Where Sold Locally*	Type of Store*	Buyer*
Raw or Frozen Sea Turtle Meat	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: _____ No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: _____ No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Major cities _____ Small cities <input checked="" type="checkbox"/> Rural areas <input checked="" type="checkbox"/>	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident <input checked="" type="checkbox"/> Foreign tourist _____ National tourist _____
Canned Sea Turtle Food Products	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: _____ No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: _____ No <input type="checkbox"/> Unsure <input type="checkbox"/>	Major cities _____ Small cities _____ Rural areas _____	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident _____ Foreign tourist _____ National tourist _____
Sea Turtle Eggs	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: _____ No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: _____ No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Major cities _____ Small cities _____ Rural areas <input checked="" type="checkbox"/>	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident <input checked="" type="checkbox"/> Foreign tourist _____ National tourist _____
Other Products (Define) _____	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: _____ No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: _____ No <input type="checkbox"/> Unsure <input type="checkbox"/>	Major cities _____ Small cities _____ Rural areas _____	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident _____ Foreign tourist _____ National tourist _____

*Please be sure to fill in all spaces.

MARKET SURVEY

Dermochelys coriacea (D.C.) - leatherback, tinglada, turtue luth, trunkback

Please check appropriate line: Yes <input type="checkbox"/> , No <input type="checkbox"/> , Unsure <input type="checkbox"/>				Please respond by placing the appropriate number in each space: (1) Always, (2) Sometimes, (3) Rarely, (4) Never		
Market Item	Manufactured In Country	Foreign Imports	Exports	Where Sold Locally*	Type of Store*	Buyer*
Carapace Wall Hanging	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Major cities <input type="checkbox"/> Small cities <input type="checkbox"/> Rural areas <input type="checkbox"/>	Hotel <input type="checkbox"/> Airport <input type="checkbox"/> Gift <input type="checkbox"/> Department <input type="checkbox"/> Street vendor <input type="checkbox"/> Marketplace <input type="checkbox"/>	Local resident <input type="checkbox"/> Foreign tourist <input type="checkbox"/> National tourist <input type="checkbox"/>
Stuffed Whole Turtles or Mounted Heads	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Major cities <input type="checkbox"/> Small cities <input type="checkbox"/> Rural areas <input type="checkbox"/>	Hotel <input type="checkbox"/> Airport <input type="checkbox"/> Gift <input type="checkbox"/> Department <input type="checkbox"/> Street vendor <input type="checkbox"/> Marketplace <input type="checkbox"/>	Local resident <input type="checkbox"/> Foreign tourist <input type="checkbox"/> National tourist <input type="checkbox"/>
Sea Turtle Skins (Raw) or Finished Leather	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: No <input type="checkbox"/> Unsure <input type="checkbox"/>	Major cities <input type="checkbox"/> Small cities <input type="checkbox"/> Rural areas <input type="checkbox"/>	Hotel <input type="checkbox"/> Airport <input type="checkbox"/> Gift <input type="checkbox"/> Department <input type="checkbox"/> Street vendor <input type="checkbox"/> Marketplace <input type="checkbox"/>	Local resident <input type="checkbox"/> Foreign tourist <input type="checkbox"/> National tourist <input type="checkbox"/>
Sea Turtle Creams, Lotions, Cosmetics, or <u>Medicines</u>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Major cities <input type="checkbox"/> Small cities <input type="checkbox"/> Rural areas <input checked="" type="checkbox"/>	Hotel <input type="checkbox"/> Airport <input type="checkbox"/> Gift <input type="checkbox"/> Department <input type="checkbox"/> Street vendor <input type="checkbox"/> Marketplace <input type="checkbox"/>	Local resident <input checked="" type="checkbox"/> Foreign tourist <input type="checkbox"/> National tourist <input type="checkbox"/>

*Please be sure to fill in all spaces.

***Dermochelys coriacea* (D.C.) - leatherback, tinglada, turtle kuth, trunkback (Continued)**

Please check appropriate line: Yes <input type="checkbox"/> , No <input type="checkbox"/> , Unsure <input type="checkbox"/>				Please respond by placing the appropriate number in each space: (1) Always, (2) Sometimes, (3) Rarely, (4) Never		
Market Item	Manufactured In Country	Foreign Imports	Exports	Where Sold Locally*	Type of Store*	Buyer*
Raw or Frozen Sea Turtle Meat	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: _____ No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: _____ No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Major cities _____ Small cities _____ Rural areas <input checked="" type="checkbox"/>	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident <input checked="" type="checkbox"/> Foreign tourist _____ National tourist _____
Canned Sea Turtle Food Products	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: _____ No _____ Unsure _____	Yes <input type="checkbox"/> to where: _____ No _____ Unsure _____	Major cities _____ Small cities _____ Rural areas _____	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident _____ Foreign tourist _____ National tourist _____
Sea Turtle Eggs	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: _____ No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> to where: _____ No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Major cities _____ Small cities _____ Rural areas <input checked="" type="checkbox"/>	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident <input checked="" type="checkbox"/> Foreign tourist _____ National tourist _____
Other Products (Define) _____	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unsure <input type="checkbox"/>	Yes <input type="checkbox"/> from where: _____ No _____ Unsure _____	Yes <input type="checkbox"/> to where: _____ No _____ Unsure _____	Major cities _____ Small cities _____ Rural areas _____	Hotel _____ Airport _____ Gift _____ Department _____ Street vendor _____ Marketplace _____	Local resident _____ Foreign tourist _____ National tourist _____

*Please be sure to fill in all spaces.

6. How many turtles of all sizes do you think are being harvested in your territorial waters each year by divers with spear guns?

Harvested Per Year	Hawksbill	Green	Leatherback
None			✓
1 - 10	✓	✓	
10-100			
100-1,000			
More than 1,000			

7. How many turtles of all sizes do you think are being harvested in your territorial waters each year by boatmen with harpoons?

Harvested Per Year	Hawksbill	Green	Leatherback
None	✓	✓	✓
1 - 10			
10-100			
100-1,000			
More than 1,000			

8. How many turtles of all sizes do you think are being harvested in your territorial waters each year by methods not covered by questions 5, 6, and 7. Please specify the harvest methods being considered. JUMPING ON BACK OF SURFACING TURTLE FROM BOAT

Harvested Per Year	Hawksbill	Green	Leatherback
None		✓	✓
1 - 10	✓		
10-100			
100-1,000			
More than 1,000			

ILLEGAL TRADE

Governments must maintain control over their natural resources. They must be able to assess population numbers and establish permissible take within their national waters. They must establish their authority and responsibility within the international community and be active participants in wildlife treaties such as CITES and the Cartagena Convention. Illegal commerce in wildlife, fisheries, and other natural resource products frustrates the role of government as the authority for its citizens. WIDECAST would like your opinion on the magnitude of illegal trade in sea turtles and their products in the Wider Caribbean. The continuing presence of such illegal trade blocks attempts by Wider Caribbean nations to initiate national and international programs to recover and manage depleted sea turtle populations. (Please circle appropriate answer.)

1. Are sea turtles being taken illegally out of season?
Always Sometimes Rarely Never
2. Are sea turtle eggs being taken illegally out of season?
Always Sometimes Rarely Never
3. Are illegal size classes of sea turtles being taken during the legal season?
Always Sometimes Rarely Never
4. Are commercial wholesale buyers purchasing sea turtle carapaces, shell, leather, or other products from your citizens and transporting these products illegally out of your country?
Always Sometimes Rarely Never
5. Are you estimate how many buyers are involved?
Always Sometimes Rarely Never
6. To which countries are the illegal sea turtle products being taken?

7. Do you think the fishermen know that their actions are illegal when they sell to the buyers?
Always Sometimes Rarely Never
8. Are foreign tourists taking purchased sea turtle products illegally out of the country?
Always Sometimes Rarely Never

6. A wide variety of individuals and professions may be responsible collectively for illegal harvest of sea turtles and their eggs. The burden of responsibility must not be placed unfairly on a single segment of the human population if others are also involved. Please indicate how important you think each group is for overall illegal harvest of sea turtles in your country.

a) Foreign tourists who take sea turtles with spear guns. (Please circle importance level.)

Not important 0 2 4 6 8 10 Very important

b) Foreign fishermen in your territorial waters.

Not important 0 2 4 6 8 10 Very important

c) Local commercial sea turtle fishermen.

Not important 0 2 4 6 8 10 Very important

d) Local commercial fishermen who take sea turtles incidental to other fishing activities.

Not important 0 2 4 6 8 10 Very important

e) Local citizens who hunt turtles for personal consumption.

Not important 0 2 4 6 8 10 Very important

f) Local citizens who patrol beaches for sea turtle eggs for sale or personal use.

Not important 0 2 4 6 8 10 Very important

g) Local citizens who discover unexpectedly a sea turtle or its eggs while they are involved in other activities such as swimming or diving for recreation or while walking the beach for pleasure.

Not important 0 2 4 6 8 10 Very important

h) Young kids looking for a way to make a little money.

Not important 0 2 4 6 8 10 Very important

7. Are these items manufactured within the country?

Yes No Not sure

If YES, by whom? LOCAL CRAFT PERSONS

8. Are tortoiseshell products imported into your country for sale?

Always Sometimes Rarely Never

If YES, from which countries do these products come?

CAYMAN ISLANDS

9. Are tortoiseshell products commercially exported for sale in other countries?

Always Sometimes Rarely Never

If YES, to which countries do most of these products go?

10. Can you estimate quantities sold or the value of these sales?

(Please specify currency)

11. Do you think that the majority of the import and export trade in tortoiseshell products in your country is handled by: (Please circle answer.)

Local professional traders	<input checked="" type="radio"/> Primary	<input type="radio"/> Sometimes	<input checked="" type="radio"/> Rarely	<input type="radio"/> Never
Foreign professional traders	<input type="radio"/> Primary	<input type="radio"/> Sometimes	<input type="radio"/> Rarely	<input type="radio"/> Never
Local store owners	<input type="radio"/> Primary	<input checked="" type="radio"/> Sometimes	<input type="radio"/> Rarely	<input type="radio"/> Never
Artisan cooperatives	<input type="radio"/> Primary	<input type="radio"/> Sometimes	<input type="radio"/> Rarely	<input type="radio"/> Never
An occasional foreign buyer	<input type="radio"/> Primary	<input checked="" type="radio"/> Sometimes	<input type="radio"/> Rarely	<input type="radio"/> Never
An occasional local buyer	<input type="radio"/> Primary	<input type="radio"/> Sometimes	<input type="radio"/> Rarely	<input type="radio"/> Never
Other _____	<input type="radio"/> Primary	<input type="radio"/> Sometimes	<input type="radio"/> Rarely	<input type="radio"/> Never

12. Which species are used? (Please circle answers)

Hawksbill Green Other _____ Not sure

STOCK ASSESSMENT

The Western Atlantic Turtle Symposium (WATS I) at San Jose, Costa Rica, in September of 1983 marked the first time that 39 governments of the Wider Caribbean had come together to discuss the status of sea turtle populations in the region. The priority task of the meeting was stock assessment; how many animals were present and how were these numbers changing with time? It was the nearly unanimous opinion of the parties to the WATS I meeting that current sea turtle population numbers were well below historical numbers and probably continuing to decline in most areas of the Caribbean. National surveys are being updated now in preparation for the next WATS II meeting scheduled for Mayaguez, Puerto Rico, in October 1987.

WIDECAST would like your opinion on some stock assessment questions that will help us assist with the WATS II effort as well as provide information for the upcoming CITES meeting. We know that absolute numbers are not available for most stock assessment questions, but "best guess" educated opinions can be very valuable for identifying problem areas where further on-site investigations may be needed.

1. How many clutches of eggs are currently laid per year in your country? (Please check the appropriate space for each species of sea turtle.)

Clutches Per Year	Hawksbill	Green	Leatherback
None			
1 - 10			
10-100		✓	✓
100-1,000			
1,000-10,000	✓		
More than 10,000			

2. What proportion of all nests do you think hatch successfully? (Please check the appropriate space for each species of sea turtle.)

	Almost None	25%	50%	75%	Almost All
Hawksbill			✓		
Green			✓		
Leatherback		✓			

BRITISH VIRGIN ISLANDS NATIONAL REPORT
WESTERN ATLANTIC TURTLE SYMPOSIUM II
12-16 OCTOBER 1987
MAYAGUEZ, PUERTO RICO

National Report presented by

Karen Lind Eckert

Wider Caribbean Sea Turtle Recovery Team (WIDECAST)

(Acting as BVI National Representative)

Bertrand Lettsome, Conservation Officer for the Ministry of Natural Resources and Labour, regrets that he was not able to attend the Symposium. He and I have worked together during the past two years to evaluate the status of sea turtles in the BVI; I am pleased to offer you the statement that he has prepared for this meeting:

The British Virgin Islands are similar to other West Indian nations in that marine turtles have played an important role in cultural and socio-economic development. Although there has never been an established commercial export of turtles, the three species that exist locally -- the Hawksbill, Green and Leatherback -- have been extensively exploited at the subsistence level. The local turtle fishery has been family- or community-oriented and, although there has been a significant decline in the fishery, the trend of community consumption continues today. Green and Hawksbill turtles are captured in nets; Leatherbacks are captured when they come ashore to nest.

no eggs sold -- local consumption

shell -- harvested heavily until late 1940's, then decline because fewer turtles were caught (heavy exploitation) and plastics and other substitutes were cheaper

price -- \$75.00-\$100.00 per shell

jewelry never a big item; apparently no export

Leatherback oil -- local medicinal uses

price -- \$30.00 per "fifth" (187.5 ml)

male genitals (Green, Hawksbill) -- dried and sold

price -- \$20.00 per piece (approximately one-inch)

currently only legal in winter months and selling for as much as \$50.00 a piece when you can find it

The opportunistic poaching of sea turtle eggs, also illegal from April to November, remains a serious threat to sea turtle conservation. While all factors tend to indicate that the level of poaching has decreased in recent years, the proportion of nests poached per season remains unknown. It is possible that the Leatherback turtles has been the most severely affected because of their restricted nesting range and the ease of nest identification. Hawksbill and Green turtles have much broader nesting ranges, encompassing

were brought to court on charges of permit violations, but the case was dismissed on a technicality. Too often there is little support in the courts for environmental law.

Marine degradation is also a problem and has resulted primarily from dredging and indiscriminate mooring. Dragline dredging has caused extensive damage to sea grass beds, which are important Green turtle foraging areas. Similarly, heavy anchors, primarily those of the "mini-cruise ships" are causing great damage to both sea grass and coral reef areas. The Dive Operators Association is particularly concerned about this problem because popular dive sites off Salt Island, Pelican Island, Ginger Island and others show an increasing level of shattered coral heads and broken reefs. To give you an example of the magnitude of this problem, an estimated 17,000 boats anchored in North Sound, Virgin Gorda, between 1977-1980.

The Dive Operators Association is working in close cooperation with the Ministry of Natural Resources and the National Parks Trust to determine where vessels should anchor to cause to least amount of damage, and is lobbying hard to force the government to require the cruise industry to pay for their own moorings. A single mooring costs about \$50,000.

Other problems include the bleaching of reefs, which is rare but very damaging, and the increasing problem of garbage dumped from visiting cruise ships and sail boats. Finally, a small but growing foreign longline industry

The problems of small numbers of nesting Leatherbacks and difficult access to the four or five potential nesting beaches, makes monitoring and enforcement very inadequate with the resources available. There is every likelihood of the Leatherback becoming extinct as a nesting species in the BVI in the near future. We are doing everything we can, including closed seasons on sea turtles and eggs, evaluating potential Marine Parks to protect foraging habitat, developing environmental awareness programs in the schools, giving seminars to local business groups and working with divers, fishermen, tourists and developers to ensure that we do not loose our Green and Hawksbill turtles as well. Sea turtles have given much to the people of the British Virgin Islands; we feel it is time to give back to the turtles the right to survive. Thank you.

* * * * *