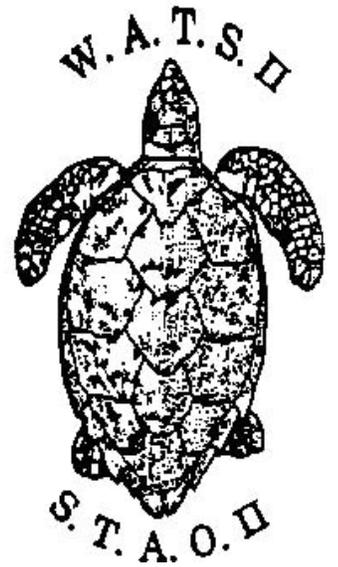


# WATS II REPORT / DATA SET



National Report to WATS II for the Dominican Republic

José A. Ottenwalder

12 October 1987

WATS2 072

Gracias al patrocinio del Servicio Nacional de Pesca Marina de los Estados Unidos, WIDECAST ha digitado las bases de datos y las memorias de los **Simposios de Tortugas del Atlántico Oeste (STAO)** con la esperanza de que estos documentos provean un contexto histórico útil en los programas de manejo y conservación de tortugas marinas en la región del Atlántico este.

Con el objetivo de servir como “punto de partida en la identificación de áreas críticas donde es necesario concentrar esfuerzos en el futuro”, el primer Simposio de Tortugas del Atlántico Oeste se llevo a cabo en Costa Rica (Julio 17-22 de 1983), y el Segundo en Puerto Rico 4 años mas tarde (Octubre 12-16 de 1987). STAO I incluye reportes nacionales de 43 jurisdicciones políticas y STAO II 37 reportes.

STAO I se inicio con la siguiente presentación: “Las charlas que hoy comienzan tienen el propósito múltiple de: actualizar nuestros conocimientos sobre las peculiaridades de las poblaciones de tortugas marinas del Atlántico oeste; conocer y analizar el alcance de los Reportes Nacionales preparados por el personal científico y técnico de mas de 30 países de la región; considerar opciones para un manejo ordenado de poblaciones de tortugas marinas; y en general, proveer un foro adecuado para intercambiar experiencias entre científicos, administradores, e individuos interesados en contribuir con la preservación de este recurso natural importante.”

Después de un cuarto de siglo los resultados de estas reuniones históricas se han perdido para la ciencia y la nueva generación de administradores de los recursos y conservacionistas. Su gran valor en proveer información básica no se ha reconocido y su potencial como “punto de partida” es desconocido e inapreciado.

Estas memorias documentan el conocimiento de la época sobre el estado y distribución de los hábitats de anidación y forrajeo, tamaños poblacionales y sus tendencias, factores de mortalidad, estadísticas oficiales sobre explotación y comercio, estimados de mortalidad por pesca incidental, empleos dependientes de las tortugas, operaciones de maricultura, e instituciones publicas y privadas relacionadas con la conservación, uso, aspectos legales (tales como resoluciones, mecanismos para cumplir la ley, áreas protegidas) y proyectos de investigación activos.

A pesar del potencial valor de esta información para las entidades responsables de valorar los recursos existentes, monitorear tendencias de recuperación y proteger hábitats críticos y evaluar los éxitos de conservación del siglo 21, los Reportes Nacionales enviados a STAO II no fueron incluidos en los memorias publicadas y, hasta ahora, han existido solo en las bibliotecas privadas de un puñado de agencias y participantes de los simposios. Para asegurar el legado de estos simposios, nosotros hemos digitado estas memorias en su totalidad - incluyendo los Reportes Nacionales, las presentaciones de las plenarios y los paneles, resúmenes de las especies, y bibliografías anotadas de las dos reuniones - y publicado en internet en <http://www.widecast.org/What/RegionalPrograms.html>.

*Cada artículo ha sido escaneado del documento original. Los errores en el proceso de escaneo han sido corregidos; sin embargo, para mantener la veracidad del contenido original (tanto como ha sido posible), algunos errores potenciales no fueron corregidos. Este artículo debe ser citado (con el número de páginas basado en el formato del documento original) así:*

Ottenwalder, J.A. 1987. National Report to WATS II for the Dominican Republic. Prepared for the Second Western Atlantic Turtle Symposium (WATS II), 12-16 October 1987, Mayagüez, Puerto Rico. Doc. 072. 54 pp.

*Karen L. Eckert  
Directora Ejecutiva WIDECAST  
Junio 2009*

**SECOND WESTERN ATLANTIC TURTLE SYMPOSIUM**

**WATS II**

**Mayagüez, Puerto Rico  
11-16 October 1987**

**NATIONAL REPORT FOR THE COUNTRY OF  
DOMINICAN REPUBLIC**

**Prepared by**

**José A. Ottenwalder\***

**September 1987**

\* Department of Zoology  
Research and Conservation  
Parque Zoológico Nacional (ZOODOM)  
P.O. Box 2449, Santo Domingo  
Republica Dominicana

# STATUS, EXPLOITATION AND MANAGEMENT OF SEA TURTLES IN THE DOMINICAN REPUBLIC

## 1. INTRODUCTION

The exploitation of sea turtles in the waters around Hispaniola during colonial times have been well documented by the early European chroniclers. According to their accounts, marine turtles were an important resource in the development of the island. Then, the fisheries were heavily supported from turtle stocks. Since then, increasing human populations and growing use of turtle products have stimulated a drastic intensification of the exploitation that probably exceeds the maximum sustainable yield of the resource. The data presented here is summarized from the unpublished report "Exploitation, conservation and management of sea turtles in the Dominican Republic" (Ottenwalder, 1987), prepared for the Western Atlantic Turtle Symposium (WATS II) and the National Marine Fisheries Service under contract with the Sea Grant Program and the University of Puerto Rico. We discuss here the results of this survey (ground-truth), as well as previous available data from aerial and ground truth surveys (Ottenwalder, 1981; Ross and Ottenwalder, 1983) to assess nesting activity, population trends and exploitation levels of sea turtles in the Dominican Republic.

## 2. METHODS

Ground-truth surveys were conducted along the coastal areas from September 1986 through August 1987 to gather data on nesting numbers, exploitation and critical habitat of sea turtles. Survey methods used are described in detail in Ottenwalder (1981). Additional field surveys were conducted in major tourist markets and selected urban areas to gather information on utilization and commercialization of sea turtle products. To allow comparison of new data with the 1980-1981 surveys, the same coastal section units used for the previous surveys (Fig. 1; see Ottenwalder, 1981) were followed to identify important critical habitats for nesting and foraging. The selected reference coastal locations and unit number used were: Bahía de Manzanillo (1); - Punta Presidente (2); Cayos Siete Hermanos (3); Boca del Yaque (4); Bahía de Icaquitos (5); Punta Bucán (6); Punta Mangle (7); Punta Rusia (8); Punta del Castillo (9); Bahía de Luperon (10); Puerto Cambiaso (11); Boca del Maimón (12); Puerto Plata (13); Boca del Camú (14); Sosua (15); Boca del Yásica (16); Boca del Joba Arriba (17); Punta Gorda (18); Río San Juan (19); Cabrera (20); La Entrada (21); Boba (22); Nagua (23); Punta Bonita (24); El Limón (25); Playa del Valle (26); Cabo Cabrón (27); Cabo Samaná (28); Punta Balandra (29); Punta Los Corozos (30); Las Garitas (31); Boca del Yuna (32); Boca del Barracote (33); Bahía de San Lorenzo (34); Sabana de la Mar (35); Las Cañitas (36); Punta Ratón (37); Miches (38); Punta Gorda (39); Punta Limón (40); Boca del Nisibón (41); Puerto Escondido (42); Macao (43); Cabo Engaño (44); Punta Cana (45); Boca del Yuna (46); Punta Algibe (47); Isla Saona (48); Punta Gorda (49); Punta Catuano (50); Bayahibe (51); Isla Catalina (52); Río Dulce (53); Boca del Cumayasa (54); Boca del Soco (55); San Pedro de Macorís (56); Guayacanes (57); Boca Chica (58); Santo Domingo (59); Haina (60); Najayo (61); Nizao (62); Playa de Baní (63); Punta Ocoa (64); Monte Río (65); Puerto Viejo (66); Punta Martín García (67); Boca del Yaque del Sur (68); Playa San Esteban (69); Paraíso (70); Punta San Luis (71); Cabo San Luis (72); Isla Beata (73); Cabo Beata (74); Cabo Falso (75); Cabo Rojo (76); Pedernales.

## 3. STATUS

### 3.1 Historical

Representations of turtles are abundant in the pictorial manifestations left by the natives of Santo Domingo on the walls of caves, and in zoomorphic figures on archeological pieces (see Herrera Fritot, 1950). When Columbus anchored offshore Montecristi, on the north coast of Hispaniola, on the 9th of January 1493, he found "many turtles, of which several were taken by the

sailors in the Monte-Cristi when the turtles came to land to lay eggs, and they were very large, as a large shield" (Las Casas, 1951; Del Monte y Tejada, 1952). In 1495, the Italian Michele de Cuneo (in Parsons, 1962; in Salas y Vazquez, 1964) wrote in his observations on Hispaniola of "an infinity of giant turtles, heavy and optimal for eating". Pedro Martir de Angleria (in Parsons, 1962) reported a mass nesting of sea turtles at Alto Velo Island. In the first part of *Historia Natural y General de las Indias*, published in 1535 (Fernando de Oviedo, 1851-1855), there are descriptive references of their abundance, size and nesting. Juan Lopez de Velasco (in Rodriguez Demorizi, 1942) wrote between 1571 and 1574 on the *Geografia de Hispaniola* "...abundance of turtles in the sea ...and in the coast and inlet of Puertohermoso..." (actually Bahia de Ocoa and Playa Salinas). "In the sea grow many turtle, very large... they also eat them and appraise their meat..." wrote Luis Geronimo Alcocer in 1650, in his *Relacion Sumaria de la Isla Hispaniola* (in Rodriguez Demorizi, 1942).

Esquemeling (1893) described mass nesting of turtles at Isla Saona. His descriptions of the four most common species of sea turtles ("cavana" or loggerhead, "caret" or hawksbill, green and leatherback) were perhaps the earliest accounts about the different turtles found in the area. In the memories of the French surgeon M. Saint (in Rodriguez Demorizi, 1973) there are observations on the abundance of sea turtles nesting in Samana Bay. Sanchez Valverde (1785) reported on the "...plentiful number of turtles along the coast of Hispaniola, and their prodigious multiplication by eggs on the beaches...". Additional references are given by Jose de Acosta (1590) and Moreau de Saint-Mery (1796).

The exploitation of sea turtles for food was found to be part of the native culture when Columbus discovered Hispaniola (Fernandez de Oviedo, 1851-1855). Carib Indians used turtle bones as arrowheads (Salas y Vazquez, 1964). The Indians employed several techniques to capture sea turtles, including the use of remoras or "peixe reverso" (Fernandez de Oviedo, 1851-1855).

There are numerous accounts of the early exploitation of turtles by Europeans in Hispaniola. Esquemeling (1893) recounts of the seventeenth century "...the most common food is the pork (of pirates and buccaneers) ...the next is tortoises, which they accustomed to salt a little..." and (referring to the habitants of Hispaniola) "...they often come and go in their canoes to the Isle of Savona, not too far distant thence, which is their chief fishery, especially of tortoises...". Of this Hispaniolan satellite, actually known as Saona Island, Fray Cipriano de Utrera (in Sanchez Valverde, 1971) quoted "...from where in 1771 some Englishmen dedicated to the fishing of turtles were evicted...". He also described Beata, another Dominican possession, as "...a solitary island in which the Spaniards had some livestock and in their time they collected turtle eggs and seabirds...".

### 3.2 Present Status

Available data indicate that historically abundant populations have been reduced to a remnant of their former size, and that no concentrated nesting occurs today. Although higher density of nesting coincides with two major sections of the coast. Dispersed nesting, particularly by the hawksbill and to some extent the green turtle, occur on any suitable beaches. Results of previous and recent surveys, show that the Dominican Republic is an important nesting area for the leatherbacks, particularly on the northeast and southwestern coast.

Available estimates of the numbers of nesting females represent approximate numbers and suggest only order of magnitude. These 1986-1987 estimates suggest that approximately 310 hawksbills, 265 leatherbacks, 225 green turtles and 50 loggerheads might nest annually in the Dominican Republic. Hawksbill and green turtles are encountered in coastal waters throughout the year, while leatherbacks appear only during the nesting season. The loggerhead is observed only occasionally. Because we have observed that a large number of the hawksbills taken by the fishermen (range from dinner-plate to medium size) do not reach the carapace length of nesting females reported from other localities (Carr et al., 1966; Carr and Stancyk, 1975; Hirth, 1980), it is

possible that the number of nesting hawksbills is smaller than estimated. On the other hand it is also likely that carapaces of adult specimens are less frequently encountered because they are often sold to the tortoiseshell dealers directly by the fishermen. Dominican fishermen frequently use the name "carey" as a synonym of all sea turtle species (although they can easily recognize the different species). This has created misunderstandings of data interpretation and official statistics.

Sea turtles in the Dominican Republic are being exploited at an alarming rate and their decline has been obvious to most fishermen. Preliminary studies suggest an even more critical situation in Haiti (Ottenwalder, Unpublished report to WATS). Our knowledge of the turtles nesting on the island is still poor and superficial. More information on their ecology and distribution, particularly that derived from tagging data, should be accumulated before predictions about their fate can be accurately attempted.

**4. CRITICAL HABITAT ASSESSMENT:** the extent of beaches, and problems related with nesting access and success.

The nesting habitats for marine turtles in the country is being reduced at an alarming rate. A number of former nesting areas have been converted for development in some cases to the extent that the habitat is no longer suitable for nesting. Several factors are involved. Ranked in order of importance, tourism, sand extraction, and to a less extent, the conversion of beaches for agricultural activities are the major causes threatening the nesting habitats. The extent and location of sea turtle nesting beaches were discussed in detail by Ottenwalder (1981) and shown in Fig. 2

Nesting habitat is increasingly being claimed for the tourist industry, which is currently considered by both government and private enterprise to be among the highest priorities for development and foreign currency income. Seven major tourist development coastal zones were designated by decree (modifications to Law 153) since 1980. These zones are Santo Domingo-La Romana; Luperon-Cabrera; Macao-Punta Cana; Samana-Las Terrenas; Barahona-Enriquillo; and Montecristi-Pepillo Salcedo. These areas comprise a large proportion of the most important nesting habitat of the Dominican Republic (i.e. Macao-Punta Cana).

Sand extraction could be singled out as one of the worst examples of coastal degradation in the country. Scars from past excavations remain throughout the shoreline, resulting in serious erosion and high sediment loads. Sand extraction for use in construction is a serious problem responsible for the destruction of a number of former nesting beaches. There are regulations prohibiting sand and coral extraction, but these are ineffectively enforced. Sand mining is regulated since the promulgation of the Mining Law No. 4550 of October 1956, and has subsequently been modified on several occasions "for the use and conservation of the resource". Regulation 1517 (April 1967) prohibits sand extraction on beaches up to 50 meters of the shoreline. Law No. 123 (May 1971) cancels all concessions (for exploitation of sand on beaches and river banks) in force prior to that date, and establishes a commission to screen request for concessions for its recommendation to the Executive.

Coastal protection has been lost in some coastal areas due to sand extraction, especially in dune habitats near the mouth of rivers. The consequences of modifying protective coastal barriers, such as reefs, dunes and mangrove were noticed during the passage of hurricane David in 1979.

Extensive coconut plantation programs, particularly on suitable nesting sites of the northeast are being promoted and supported by the government's Department of Agriculture.

Although marine pollution does not yet seem a very serious problem, of particular concern is the problem represented by the heavy traffic of oil tankers in the area of the Mona Passage. This

passage is adjacent to the northeastern portion of the country, where the highest density of nesting turtles has been estimated. According to the U.S. Environmental Protection Agency a trajectory model of an hypothetical oil spill of 6,000 barrels of crude east of Mona Island indicated that the oil would reach the eastern shore of the Dominican Republic in three days, and would spread as far as La Romana and Laguna Limón in five days. The Dominican Republic lack emergency plans and oil clean-up equipment to handle spills. Playa de los Muertos, and the important beaches between Punta Nisibon and Punta Macao, where perhaps the largest population of leatherbacks nest in the country, is already suffering from oil pollution.

## 5. EXPLOITATION

### 5.1 Local

Most turtles are taken in coastal waters by divers using spear guns. They are also taken in chinchorros or seine nets, and purse nets, but this type of capture is only incidental. During breeding season, nesting females are caught and killed on the beach and their eggs taken whenever possible, while adult males (and often females) are netted in "folas", nets which bear a floating turtle-chapped decoy that is carved in wood. The "folas" are set to block nesting beaches. Fishermen and "tortugueros" move to fishing camps at remote nesting beaches during the breeding season, to catch turtles and collect eggs. Despite laws regulating their capture, turtles of all sizes and species are taken by the fishermen. Hawksbill and green turtles represent most of the catch in coastal waters. They are taken throughout the year. Loggerheads are taken with some frequency at sea and occasionally while nesting. Because leatherbacks usually approach the coast only during the nesting season, they are primarily taken at that time. They are usually captured on the beach or in "folas", and only rarely harpooned because of their large size. In the past, leatherbacks were generally disregarded as food in a number of coastal areas because the meat is dark, tough, of a strong and not as tasty flavor as the meat of the other species. Their eggs were not in high demand until recently. Actually, because of the scarcity of both green turtles and hawksbills, leatherbacks are utilized as a substitute. Because leatherbacks meat is not well liked, it is often cut into steaks and mixed with hawksbill and green turtle meat before it is sold. In 1980, local prices for turtle meat range from 50 cents/pound in coastal areas, RD \$1-1.50/ pound as regular price, to RD \$2.50/ pound, depending on the kind of turtle and meat cut. In 1986, prices ranged from \$2.50 to \$7.00.

Use of sea turtle eggs for food is one of the major conservation problems facing turtle populations in the Dominican Republic. Culturally this problem is aggravated by the traditional and erroneous belief that turtle eggs have aphrodisiac qualities. To some extent, the meat is also alleged to be a sexual stimulant. Demand for turtle eggs is therefore high, and the price from the nesting beach to markets in the large cities, can easily range from \$0.50 to \$1.50 each. Most beaches on which sea turtles nest are patrolled at least regularly during the nesting season by fishermen who look for turtle tracks and dig eggs. If fresh tracks are found the re-nesting date is estimated, usually with good accuracy and the turtle is slaughtered upon her return.

Turtle oil is also extensively marketed. Most of it goes to pharmonochemical companies for use in cosmetics. One of these companies began exporting refined turtle oil to the United States during 1980. Locally, turtle oil is sold in public markets, and by private vendors. It is sold at a price ranging from \$5 to \$30 pesos. Pure oil is frequently mixed with other skin creams, butter (for consistency), and "bija" (a vegetable extract that adds color), and vegetable oil. Some sea food stores also sell half liter bottles at \$30 pesos, often mixed with shark oil.

Official capture statistics for sea turtles are not only scarce and incomplete, but insufficiently classified or, in some cases, organized in an ambiguous way. Access to statistics of annual capture for exportation of turtle products is made difficult by the lack of cooperation from both official and private sectors. I present here the available data in order to suggest approximate levels of exploitation. Unfortunately, most of the data has been categorized under "carey" or "turtle" or

both, since statistics are not registered by species. It is important to note that most of the turtles killed on the nesting beach, especially near remote coastal settlements are probably not included in the statistics.

INDOTEC (1980) estimated that "only 45 to 70 tons" of sea turtle meat are landed annually in the Dominican Republic. According to the original source of these data (Secretaría de Estado de Agricultura), the capture between 1975 and 1978 was 287 tons, while from 1970 to 1974, only 8 tons were recorded. However, no data is given for the years 1972 and 1973 (Table 1). The capture between 1967-1971 was 35,435 kg, which included 16,110 kg of "turtle" and 19,325 kg of "carey" (Oficina Nacional de Estadística 1970, 1971). During the last few years the amount captured has increased remarkably according to figures produced by INDOTEC (1980), and the figures reported by the Secretaría de Agricultura of the total turtle meat produced between 1979 and 1981, when a total of 353,658 kg were reported. Although the recording of the fisheries landings statistics was perhaps deficient until 1975, they show that at least 681,093 kg were landed between 1967 and 1981, with an annual average of 52,392 kg (excluding the years of 1972 and 1973). If we assume that the annual capture for the two missing years was equal to the annual average over the years for which data is available, the total capture from 1967 to 1986 may be estimated as 1,298,737 kg. Because the figures prior to 1975 may be minimum values, this estimate is considered conservative. Between 1979 and 1981, the fluctuations in total capture of turtles seem to be associated with the nesting season.

In addition to eggs and meat, hawksbill turtles are heavily exploited for their shell. It is the species most valued by the Dominican fishermen. The regulation protecting the species is practically ignored. Raw tortoiseshell from medium to large specimens goes to the local artisans to be worked, and to local or foreign dealers to be illegally exported. Some worked tortoiseshell is also exported. Juvenile and sub-adult hawksbills are usually stuffed to be sold whole for more money than their tortoiseshell would have brought. This is because the scutes are too thin and small to be profitably worked. Most carapaces for sale in tourist shops are from small to medium sized turtles (Table 3). This might suggest the age classes that are most harvested. Adults with very thin scutes are also sold stuffed, or more often, as polished carapaces. According to the size, a stuffed hawksbill sells for \$30-80 (small), \$80-300 (medium), or more (large). Attractive and very large stuffed specimens are sold for as much as \$1,500. A fisherman is paid between \$75-90/pound of tortoiseshell, depending on the quality of the scutes, the region and the dealer. Many fishermen travel to Santo Domingo to look for a better market and to avoid intermediaries. Tortoiseshell is regularly worth \$150 in the market in Santo Domingo.

## 5.2 International

Exportation of raw tortoiseshell from the Dominican Republic has been illegal since January 18, 1967. This regulation was not created to protect hawksbill turtles, but to protect the jobs of a growing number of Dominican artisans by guaranteeing the availability of material. The legal basis of this legislation originated from the large amounts of raw tortoiseshell that was being exported prior to 1967. The exportation of worked tortoiseshell is not prohibited. Considering only the published statistics from importing countries, at least 13,075 kg of raw tortoiseshell has been exported by the Dominican Republic between 1964 and 1986 (Table 4). Although the 1967 regulation does not protect hawksbills within the Dominican Republic, it could be an effective control against the exportation of raw tortoiseshell, inasmuch as the international market is one of the greatest incentives for exploitation.

There is good evidence that raw tortoiseshell is being exported illegally. According to the Japanese imports statistics, 1,352 kg were imported from the Dominican Republic in 1967 and 1,178 kg in 1968 (Table 4). After that year, Japan's records show that no tortoiseshell was imported from the Dominican Republic between 1969 and 1971. Since 1972, illegal exportation to Japan started again, increasing gradually, until 1986 when a total of 569 kg were imported.

Tortoiseshell was also exported from the Dominican Republic to countries other than Japan: 254 kg were imported by Spain in 1976, and 493 kg in 1977, by a country not specified (Mack et al, 1979; Inskipp and Wells, 1979). Therefore at least 5,221 kg were exported illegally from the Dominican Republic since the 1967 regulation took effect. CEDOPEX, the agency responsible for enforcing the regulation in the Dominican Republic (but also responsible of promoting exportation) certified to us that according to their records no exportation of tortoiseshell between 1974 and 1986 was registered (Appendices). However, some CEDOPEX officials were aware of the fact that raw tortoiseshell was being exported illegally, and had observed that it was often declared as "personal effects" or "plastic material". According to the information we obtained, exporters deal directly with importers, and only have to declare their shipment to CEDOPEX using the export license issued to them by CEDOPEX. The contents of the shipment are never verified by the agency, since these are functions of the Dominican Customs. There are at least four major tortoiseshell exporters in the Dominican Republic. Other dealers supply it only to local artisan workshops, independent artisans, gift shops and jewelry stores. Dominican tortoiseshell artistry is widespread and diverse.

The volume of tortoiseshell illegally exported each year from the Dominican Republic to Europe under the category of "personal effects" is unknown but is estimated to be considerable. A major Amsterdam firm that deals in raw tortoiseshell and ivory received two shipments (totaling 251.2 kg) declared as "used personal and household effects" from a Dominican dealer on September (92.1 kg) and November (159.1 kg) of 1980. I also obtained information indicating that the Dominican dealer had sent regular shipments (every 2 or 3 months) to the same firm in Amsterdam since 1977. Tortoiseshell is also exported as part of artisanal or industrial manufacturers (pipes, ornaments, luxury items) but is not properly declared. Worked tortoiseshell is mostly sold to European countries, including CITES signatories.

Records of CEDOPEX show that US \$2,299 worth of tortoiseshell products were sold to France in 1975, and \$606 to the United States in 1976. Tortoiseshell jewelry, artifacts and stuffed turtles are acquired by European tourists (mainly Italian and Spanish) in Santo Domingo. Very few Americans take turtle souvenirs home with them since the regulations were established that forbid its entry into the United States. The Dominican Republic recently became a party member of CITES.

### 5.3 Summary of Exploitation

1. Turtles of all species regardless of their size are taken whenever possible.
2. According to data gathered from interviews with fishermen, sea turtles are today captured only occasionally. Frequency of captures ranges from one turtle/week to one turtle/three weeks. Between 1,000 to 2,000 turtles of all sizes and species are presumably taken every year. Reportedly, 70% of the turtles captured are hawksbill and greens.
3. Considering that between 1964-1986, the Dominican Republic exported at least 13,075 kg of tortoiseshell to Japan and some European countries, we estimate that at least 6,500 hawksbills have been taken during that period in Dominican waters for the international trade alone.
4. Reportedly, an estimated 600 kg of the tortoiseshell is utilized every year in the Dominican Republic. Since the fisheries of hawksbill turtles has dropped considerably during the past ten years, about 60 to 70% of the tortoiseshell utilized is imported from St. Maarten, Panama and The Bahamas. Small amounts are also obtained from Haiti (through the border), Cuba (at sea) and even from Puerto Rico (smuggled in the trunks of cars transported in the ferry that serves the route between P.R. and D.R.
5. Reportedly, exports of tortoiseshell to Japan is no longer as attractive as it used to be in the past. According to the dealers, the local market, including the tourist market for worked bekkō (particularly Canadians, Italians and Spanish) is far more profitable.

6. The Dominican Republic was only a moderate source of bekko, and a minor source of other tortoiseshell and worked bekko for Japan between 1970 and 1986 (Milliken and Tokunaga, 1987).

## 6. FISHERIES INFRASTRUCTURE

### 6.1 Socioeconomic aspects

After several centuries of exploitation, the reduced sea turtle stocks of the Dominican Republic retain today their great value as subsistence and income for an increasing human population. Demand for sea turtle products, stimulated by social and economic problems, as well as by higher prices in both local and world markets, is now assisted by modern technology. With the decline of marine turtles on nesting beaches, exploitation has been gradually concentrating in coastal waters. This has been facilitated with the availability of scuba equipment, outboard motors and larger fishing boats, allowing the hunting of sea turtles in coastal lagoons, reef systems and offshore banks to be more efficient.

The distinction between subsistence hunting and commercial exploitation in the Dominican Republic is not easily made. Most fishermen are very poor. One sector works independently, or in small groups. Another sector is associated in cooperatives that either are owned by the fishermen, or are organized and supported by IDECOOP (Instituto de Desarrollo y Credito Cooperativo). A third and important one is organized by patrones de pesca who loan the fishermen whatever gear they need (boats, motors, scuba, harpoons and spearguns, compressors, lines, nets and diving gear). Under this latter arrangement the fishermen are compromised to sell the harvest to their patrons, although they are in most cases allowed to keep some of their catch for their own consumption. The criteria by which the price for the different sea products is established is variable and very often imposed by the patrones. The prices are also influenced by other factors, such as the distance the refrigerated trucks and boats must travel to reach the fishing camps or villages.

Some of the "patrones" control operations of regional importance, and over hundred fishermen may work for them. The patrones might sell their products to intermediaries, or directly to sea food distributors or exporters. In any case, intermediaries are involved in every step, and prices rocket after reaching wholesale dealers (i.e. tortoiseshell, lobster). In this socioeconomic context, the most common philosophy behind legal enforcement can be summarized as follows: a fisherman found taking eggs or killing turtles illegally is fighting for his subsistence and too poor to be punished. On the other hand, dealers, from patrones to firm owners, are too important, to be bothered by fisheries inspectors, and therefore to be reached by the law. Fishing cooperatives, which are the best alternative to protect fishermen from exploitation, are for the most part poorly organized and lack technical advice and economical support. None of these sectors take sea turtle legislation seriously.

### 6.2 Fishing fleet and equipment

The fishing fleet is estimated to consist of 2,356 units, dominated by 1,156 "yolas" (49%) which measure 3-6 m in length, and 991 dugout-canoes or "cayucos" (42%) which are between 4-6 m in length. Boats (169) ranging in length from 4.6-7.3 m represent 7% of the total, while fishing ships (37) with a length of over 7.6 m represent the remaining 2%. Seventytwo percent (830) of the yolas, 13% (131) of the cayucos, 78% (131) of the boats, and all of the ships are motorized (INDOTEC, 1980). The major fishing zones are associated with the wider shelf areas and submerged banks including Banco Monte Cristi (892 km<sup>2</sup>), Bahia de Samana (858 km<sup>2</sup>), Cabo Engano (772 km<sup>2</sup>), San Pedro de Macoris (463 km<sup>2</sup>), Bani-Barahona (858 km<sup>2</sup>) Banco Navidad (772 km<sup>2</sup>) and Banco de la Plata (1,955 km<sup>2</sup>).

## **8. REVIEW OF SEA TURTLE SURVEYS AND RESEARCH PROJECTS**

### **8.1 Past surveys and research**

Very little was known about the status and distribution of sea turtles in the Dominican Republic before the 1980's (see Ingle and Smith, 1949; Rainey and Pritchard 1972; Rebel, 1974; Bacon 1975) and with the exception of a few isolated reports (Ottenwalder and Saniley, 1976, 1980; Ottenwalder, 1980) published data about nesting species before that date is virtually non-existent.

On August 1978, Thomas Carr visited the country to conduct field surveys and interviews as part of the surveys of sea turtle populations and critical habitats in the Western Atlantic. The results of his observations were summarized by Carr et al. (1982).

Systematic studies started during 1980 when two survey and research projects were conducted. The status and population size of the nesting population of the leatherback turtle were investigated between March 24 and April 13 (Ross and Ottenwalder 1983). A second project, developed during 1980-1981) was conducted with the support of the Caribbean Conservation Corporation and the National Marine Fisheries service on behalf of the Western Atlantic Turtle Symposium (WATS I). This project generated data on status, distributions, nesting activity, population estimates and critical habitat (nesting, foraging and developmental) of nesting species (Ottenwalder 1981). A tagging and hatching program was also started that year in the Barahona Peninsula at Mosquea, San Luis and Inglesa beaches (Ottenwalder 1981, Ottenwalder and Inchaustegui, MS) with support from the Caribbean Conservation Corporation, the Parque Zoológico Nacional (ZOODOM) and the Museo Nacional de Historia Natural. Leatherback, hawksbill and green turtles have been tagged and successfully hatched in this program. Hatchlings are released on the beach soon after hatching. So far, most turtles hatched have been leatherbacks, with hawksbills second in number.

### **8.2 Present and planned surveys and research**

At present a survey to re-assess nesting numbers and to document exploitation levels of sea turtles and their products in the Dominican Republic is being concluded (Ottenwalder this report, and manuscript in preparation). The investigation was conducted under contract with the Sea Grant Program and the University of Puerto Rico on behalf of the Western Atlantic, Turtle Symposium (WATS II).

Conservation/research projects and integrated conservation/development oriented programs have been planned and defined, but these have been hampered by lack of funds locally.

## **9. LOCAL MANAGEMENT/CONSERVATION AGENCIES**

The Departamento de Recursos Pesqueros (Subsecretaría de Recursos Naturales, Secretaría de estado de Agricultura) is the government authority responsible for the management of both freshwater and marine wildlife, and as such, the agency responsible for enforcing sea turtle regulations. Traditionally, the major emphasis of the DRP has been to promote the development of government and private aquaculture programs, neglecting the management and conservation of native wildlife.

Other agencies involved and/or interested in management of sea turtles are:

1. Dirección Nacional de Parques  
Apartado 2487  
Santo Domingo  
República Dominicana  
Tel: 685-1316

2. Parque Zoológico Nacional (ZOODOM)  
Apartado 2449  
Santo Domingo  
República Dominicana  
Tel: 562-3149
  
3. Centro de Investigaciones de Biología Marina (CIBIMA)  
Universidad Autónoma de Santo Domingo (UASD)  
Santo Domingo  
República Dominicana
  
4. Centro Dominicano de Promoción de Exportaciones (CEDOPEX)  
Apartado 199-2  
Ave. 27 de Febrero  
Santo Domingo  
República Dominicana  
Tel: 566-9131
  
5. Fundación Dominicana Pro-Investigación y Conservación de los Recursos Marinos, Inc.  
Santo Domingo  
República Dominicana  
P.O. Box 21449.  
Tel: (809) 689-3128

## 10. LEGISLATION

The first legislation protecting sea turtles in the Dominican Republic was promulgated on June 28, 1938 (based on Ley de Pesca No. 5187). Since then, several laws and decrees concerning sea turtles have been legislated. At present the regulations in force are the Ley de Pesca No. 5914 (May 1962) and the Decree No. 314 of October 1986. The text of the current regulation is translated below.

Art. 1: The capture and commercialization of marine turtles which do not reach the following sizes is prohibited:

	<u>Scientific Name</u>	<u>Common Name</u>	<u>Carapace Length</u>
a)	<i>Chelonia mydas</i>	Tortuga verde	90 cm
b)	<i>Eretmochelys imbricata</i>	Carey	71 cm
c)	<i>Dermochelys coriacea</i>	Tinglar	152 cm
d)	<i>Caretta caretta</i>	Catuano/Caguamo	152 cm

Paragraph: The capture of all females nesting or out of the water is prohibited regardless of its size.

Art. 2: All violations of the present decree will be punished as provided in Article 47, letter c) of the Law No. 5914 of 22 May 1962.

## 11. MANAGEMENT: DISCUSSION AND RECOMMENDATIONS

The difficulties of assessing the size of sea turtle populations (Bustard, 1979; Meylan, 1982), are complicated by the fact that tag returns (recapture rates of tagged females) are affected by a number of factors, which influence the interpretation of fluctuations of nesting populations. Furthermore, ignorance of sex ratios at hatching or maturity, and age structure, prevents extrapolation of nesting females to total populations. The time required to reach sexual maturity, and the

average number of nesting seasons that a given adult female will survive are again unknown. Captive turtles grow and mature quickly, as shown by studies of green turtles (Witham, 1970), hawksbills (Witzell, 1980) and loggerheads (Nuita and Uchida, 1982), but this situation seems directly related to movement restriction, the quality and quantity of food and to water temperature. Under natural conditions, maturation size appears variable (Carr and Carr, 1970) and growth rates are much slower, suggesting (at least for green turtles) that sea turtles require in excess of 30 years to reach minimum breeding size (Limpus, 1980). Therefore it is possible that the effects of exploitation, or conversely of conservation measures (shown by numbers of nesting adults) will only be evident after a number of years. So far, there is no confirmed evidence of nesting in the wild, anywhere, by turtles produced through manipulation of eggs and hatchlings (i.e. artificial incubation, egg and hatchling transplant, headstarting) and released for restocking.

Population censuses from only a few years back are not enough to base any conservation management practices. Carr et al. (1978) showed that striking seasonal variation in the number of nesting (green) turtles could be expected. Their data, which reports on 22 years of tagging at Tortuguero, Costa Rica, also estimated that the average number of nests per female per season is 2.8 rather than previous estimates of 3 to 7 (Hirth, 1971). Similar fluctuations are detectable in demographic and population modeling studies (Richardson et al., 1978; Marquez and Doi, 1973; Bjorndal, 1980). Low survival rates of adults and hatchlings in a green turtle rookery under exploitation suggested the extinction of the population within 40 years (Bjorndal, 1980), as man-induced mortality of adults, hatchlings and eggs prevented reproductive output and recruitment.

### Recommendations and Management Options

#### 1. Species management

The existing regulations which protect sea turtles in the Dominican Republic are not adequate, and some modifications and additions are strongly recommended. Based upon available reproductive data for the four species that nest in the country (Ottenwalder, 1981, 1986) the closed season should extend from late March to November. Considering a) the decline of turtle populations and reduction of their nesting habitats since historical times, and b) current trends of exploitation, a total ban is recommended for all species.

Since in the Dominican Republic a total ban on sea turtle exploitation would not have much chance of success, at least not under the present socio-economic conditions and law enforcement structure, only subsistence harvest is to be allowed during non-closed season. The use of "folas" and spearguns to kill or capture sea turtles should be prohibited. The current regulations must be modified also to provide protection to nests and eggs on nesting beaches. Commercialization of sea turtle products should be totally prohibited.

A rigid closed season is necessary if sea turtle population are to be saved from extirpation. During the closed season, protection should include both nesting and interesting habitats. During the open (non-breeding) season harvesting in feeding and development habitats should be permanently banned in designated sanctuaries (see Habitat Protection). Inforcement of the law must be improved to increase the survival rates of eggs and hatchling, and particularly of breeding adults, which represent the fraction of the population with the highest reproductive value. We strongly recommend the modification of Decree No. 314 of 1986 to read as follows: "The capture, killing, possession and commercialization of leatherback, green, hawksbill and loggerhead turtles with a carapace length (straight line) of more than 60 cm is prohibited along the coasts and territorial waters of the Dominican Republic".

## 2. Habitat protection

A major portion of the remaining breeding sites for each species should be covered by strong habitat conservation legislation to ensure that turtles have the necessary beaches for nesting, that disturbance of the nesting adults and their eggs is minimized, and that the hatchlings successfully disperse from these beaches. The local Department of Fisheries Resources should initiate a coordinated action with other divisions of the Ministry of Agriculture, as well as with the Ministries of Tourism and Minery. This kind of coordinated effort should allow better planning and use of coastal resources to reduce or prevent further destruction of nesting habitats. The goal of sea turtle habitat protection should be to protect the turtles while permitting activities not detrimental to the turtles. Controlled tourism in certain areas can have positive conservation value through a well planned environmental education program. Sand and coral extraction are regulated by law and authorities must be encouraged to enforce these statutes.

The designation of reserves or marine sanctuaries for sea turtles is considered critical to guarantee the maintenance of populations. As feeding and development areas, we propose the waters of Cayos Siete Hermanos, B de Manzani 11o, B. de Montecristi, B. Icaquito hasta B. de la Isabela, B. Escocesa, B. de Rincon, B. de San Lorenzo, Puerto Icaico hasta Cabo San Rafael, Bahia Catalinita, Isla Saona, Isla Catalina, Boca de Yuma, B. Calderas, B. Ocoa, Puerto Viejo, B. Neiba, Puerto Bello, P. San Luis a Cabo Mongon, Canal de Beata y Bahia de las Aguilas. As nesting habitats, we recommend the beaches of Punta Rucia, La Ermita, Bahia Escocesa, Punta Nisibon to Boca del Maimon, Cabo San Luis to cabo Mongo, Cabo Beata to Cabo Falso, Bahia de las Aguilas, Isla Beata, and Isla Saona.

## 3. Incidental catch

There is no evidence to support that incidental catch of sea turtles might represent a significant fraction of the capture.

## 4. Subsistence harvest

The demographic, economic and cultural implications of sea turtle conservation, are common elsewhere and have been discussed for the Indian Ocean by Frazier (1975, 1979, 1980), and for the Caribbean coasts of Central America by Nietschmann (1979, 1982). Subsistence hunting is an important factor to consider. Although the original native populations of the West Indian islands disappeared during the development of the colonial system, they were soon replaced by other cultures that have also been heavily exploiting the islands wildlife resources (Westermann, 1952, 1953). This is a delicate issue. The implementation of this sort of program will require socio-economic baseline studies on coastal areas that are no yet available. Additionally its success will depend on the amount of manpower available for the monitoring of harvest levels. However, subsistence harvest could also represent a potential source for the black market of sea turtle products.

## 5. Commercial harvest

Basic research on natural history parameters (e.g. turtle standing crops in reef communities, recruitment, growth rates, and dispersal patterns) of sea turtle populations in Hispaniolan waters is needed before acceptable harvest rates and quotas could be advised to government and private fisheries sectors. Since the determination of parameters such as reproductive life expectancy and recruitment rates could not be available in the short term, the research needed is long term but without it we cannot plan for sustained yield harvests. Therefore, commercial exploitation must be strictly controlled and exportation of any turtle product prohibited.

## 6. Fisheries in international waters

Dominican fishermen are known to fish turtles in the Turks and Caicos Islands and in Bahamian waters, exploiting turtle stocks out of the Dominican Republic's territorial sea, this is a controversial area due to the overlap of assumed "exclusive economic zone" (200 nautical miles) of different islands. International conventions and agreements, including migratory species, in the case of exploitation in international waters, or CITES, on the trade of wildlife are the appropriate regulations which deal with this problem. The Dominican Republic recently became a party member of CITES.

## 7. Management oriented research and conservation

The options to conserve sea turtles in the Dominican Republic are influenced by many factors, but particularly, by our limited knowledge of sea turtle biology. In addition to the little known data on population dynamics, no solid clue is yet available elsewhere about other factors such as the "lost year" of hatchlings (Carr, 1980; Witham, 1980) and the migratory patterns of different life history stages (Juvenile to adult). To manage sea turtles rationally, more studies need to be done in the Dominican Republic. The best strategy in the immediate future is to concentrate efforts on research, protection of existing populations, and development of conservation practices.

Studies on general biology of sea turtles, distribution, utilization of feeding and developmental habitats, and structure of the population are highly desirable, although, if funds are limited, priority should be given to the assessment of nesting populations through tagging projects and systematic field surveys. The two areas with higher nesting densities are recommended as sites for systematic tagging projects. Since the nesting populations are declining, special attention must be paid to investigate the sources of mortality affecting the breeding adults. At present, the only conservation program contemplated is the operation of hatcheries in areas of heavy poaching, predation or erosion. However, the removal of eggs from natural nests should not be undertaken if unjustified.

Turtles are vulnerable species. It is of both government and public concern and responsibility to protect this important resource on behalf of maintaining future options for the Dominicans to come. Under the actual trends of sea turtle exploitation, any effort to enhance conservation could not make their situation worse, but only improve it.

**TABLE 1. TOTAL LANDINGS OF SEA TURTLE MEAT ("CAREY AND TORTUGA") IN THE DOMINICAN REPUBLIC BETWEEN 1967 And 1986**

Year	Sea Turtle Meat Harvest Reported (Kg)	Source
1967	11,428	a
1968	16,127	a
1969	4,609	a
1970	2,942	a
1971	329	a
1972	NA	
1973	NA	
1974	5,000	b
1975	66,000	b
1976	45,000	b
1977	47,000	b
1978	129,000	b
1979	94,180	c
1980	122,578	c
1981	136,900	c
1982	51,704	a
1983	98,571	a
1984	51,970	a
1985	44,960	a
1986	41,768	c
TOTAL	1,298,737	

Sources: a) Oficina Nacional Estadística (1970, 1971, 1986)  
 b) INDOTEC (1980)  
 c) Departamento Recursos Pesqueros (Annual Reports)

**TABLE 2. EXPLOITATION INTENSITY, EXPRESSED AS TOTAL PRODUCTION OF SEA TURTLE MEAT (IN KG), PER MONTH, IN THE DOMINICAN REPUBLIC, 1979-1981**

Month	1979 <sup>a</sup>	1980 <sup>b</sup>	1981 <sup>b</sup>	Total	(Mean)
January	15,680	3,835	5,851	25,4	(8,5)
February	7,550	3,747	4,181	15,5	(5,5)
March	5,086	6,604	4,166	15,9	(5,3)
April	6,751	20,544	15,085	42,4	(14,1)
May	6,807	21,945	5,425	34,2	(11,4)
June	8,314	22,373	19,930	50,7	(16,9)
July	8,488	9,201	7,645	25,3	(8,4)
August	8,619	26,841	11,512	46,9	(15,6)
September	1,897	41,429	7,727	51,1	(17,0)
October	NA	6,197	23,469	29,7	(14,8)
November	NA	11,528	31,917	43,4	(21,7)
December	NA	15,928	NA		

Sources: a) Oficina Nacional Estadística (1980)  
 b) Departamento Recursos Pesqueros (Annual Reports)

**TABLE 3. SURVEY OF SEA TURTLE CARAPACES AND SHELL PRODUCTS RECORDED IN MARKETS AND TOURIST SHOPS OF SANTO DOMINGO DURING AUGUST 1987**

Size Class (cm)	No. Of Carapaces			Total	Percent
	<i>Eretmochelys</i>	<i>Chelonia</i>	<i>Caretta</i>		
20	0	0	0	0	0
20-30	22	3	0	25	17.2
30-50	79	18	0	97	66.9
50-70	6	3	0	9	6.2
70-90	3	4	1	8	5.5
90	0	4	2	6	4.1
TOTAL	110	32	3	145	---
%	75.9	22.1	2.1	---	---

**TABLE 4. JAPANESE IMPORTS OF BEKKO AND OTHER TOROISESHELL (KG) FROM THE DOMINICAN REPUBLIC, 1964 TO 1986, RECORDED IN JAPANESE CUSTOMS STATISTICS. LINE INDICATES YEAR OF REGULATION PROHIBITING EXPORTATION OF BEKKO. ASTERISK INDICATES ADDITIONAL EXPORTS OF BEKKO TO COUNTRIES OTHER THAN JAPAN. \***

Year	Bekko		Other Tortoiseshell
	Worked	Unworked	
1964		1,767	
1965		1,594	
1966		1,820	
1967		1,352	
1968		1,178	
1969		---	
1970		---	
1971		---	
1972		62	
1973		4	
1974		11	
1975		31	
1976*		113	
1977*		507	
1978*		---	62
1979*		219	
1980*		534	
1981		357	44
1982		872	
1983	3	248	
1984	28	636	
1985		203	
1986		569	
TOTAL	31	12,077	106

Sources: Mack, Duplaix and Wells (1979). Japan Exports and Imports, Commodity by Country (1974-1981); Milliken and Tokunaga (1987)

## APPENDIXES

### EXPORTACIONES EN KG. Y VALOR DE LOS SIGUIENTES PRODUCTOS PARA 1974-1981

Año	Concha y Una de Carey		Carey		Aceite de Tortuga	
	Peso Bruto Kg	Valor FOB	Peso Bruto Kg	Valor FOB	Peso Bruto Kg	Valor FOB
1974	---	---	---	---	3,694	1,429
1975	---	---	4,634	4,478	---	---
1976	---	---	3,853	3,270	---	---
1977	---	---	7,099	5,200	100	180
1978	---	---	---	---	---	---
1979	---	---	1,554	1,535	---	---
1980	---	---	2,858	5,400	---	---
1981	---	---	3,426	5,477	---	---

Fuente: CEDOPEX - Unidad de Estadística

Nota: Como se aprecia en el cuadro no se han registrado exportaciones de concha y uña de carey, no hay más cifras exportadas como subproducto del carey.

PFB/mz.

Santo Domingo, D. N.

23 de junio de 1982

Exportation of marine turtle products from Dominican Republic 1974-1981, reported by CEDOPEX, showing no official records of exportation of tortoiseshell.

### EXPORTACIONES NACIONALES DE TORTUGAS MARINAS (CAREY Y/O TORTUGA) Y DERIVADOS 1976-1986 (Valor en US\$)

Año	Carey		Aceite de Tortuga		Carne de Tortuga	
	Kilos	Valor	Kilos	Valor	Kilos	Valor
1976	3,853	3,270	---	---	---	---
1977	7,099	5,200	100	180	---	---
1978	---	---	---	---	---	---
1979	1,554	1,535	---	---	---	---
1980	2,858	5,400	---	---	---	---
1981	3,426	5,477	---	---	---	---
1982	4,294	6,471	---	---	---	---
1983	651	1,014	---	---	146	221
1984	---	---	---	---	8	100
1985	454	460	---	---	---	---
1986	1,193	1,800	---	---	---	---

Fuente: CEDOPEX

DL/yg

Santo Domingo, D. N.

24 de agosto de 1987

**EXPORTACIONES NACIONALES DE CAREY POR PAISES DE DESTINO 1976-1986 (En US\$)**

Año	Puerto Rico		Guadalupe y Dep.		Martiniica		Francia		Saint Marteen	
	Kilos	Valor	Kilos	Valor	Kilos	Valor	Kilos	Valor	Kilos	Valor
1976	3,853	3,270	---	---	---	---	---	---	---	---
1977	7,099	5,200	---	---	---	---	---	---	---	---
1978	---	---	---	---	---	---	---	---	---	---
1979	980	860	646	675	---	---	---	---	---	---
1980	---	---	---	---	2,858	5,400	---	---	---	---
1981	---	---	592	979	2,834	4,489	---	---	---	---
1982	2,996	4,650	45	150	499	605	714	866	40	20
1983	---	---	236	399	141	169	274	446	---	---
1984	---	---	---	---	---	---	---	---	---	---
1985	454	460	---	---	---	---	---	---	---	---
1986	1,193	1,800	---	---	---	---	---	---	---	---

Fuente: CEDOPEX  
DL/y9  
1 de octubre de 1987

**EXPORTACIONES NACIONALES DE CARNE DE TORTUGAS POR PAISES DE DESTINO DURANTE EL PERIODO -1983-1984 (VALOR EN US\$)**

Países	1983		1984	
	Kilos	Valor	Kilos	Valor
Estados Unidos	---	---	8	100
Francia	126	191	---	---
Martinica	20	30	---	---

Fuente: CEDOPEX  
ACEITE DE TORTUGA: Las exportaciones de aceite de tortuga fueron realizadas, en su totalidad, hacia el mercado de los Estados Unidos.  
DL/rc

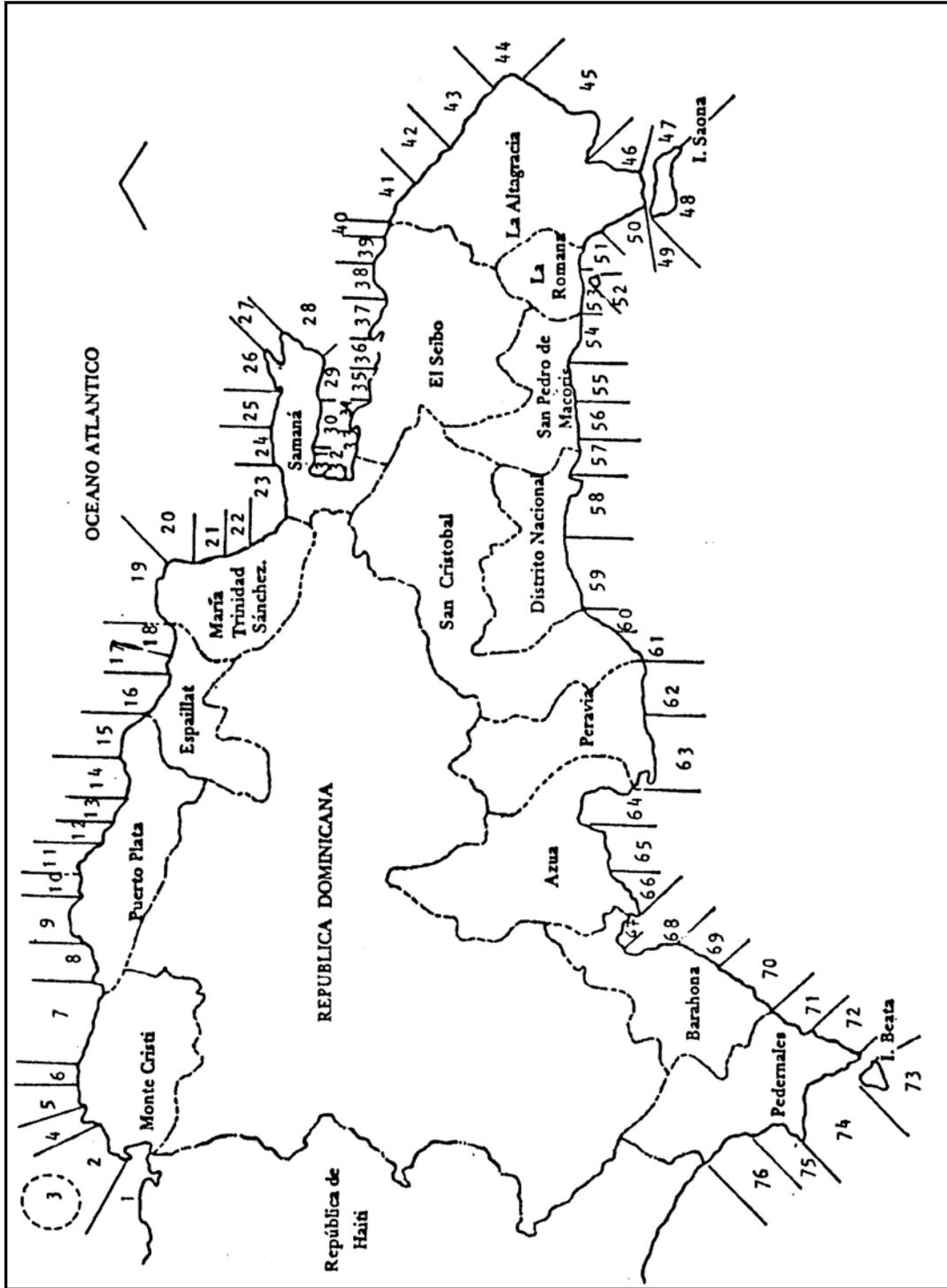


Figure 1. Coastal section units used during beach and pelagic surveys for sea turtles in the Dominican Republic

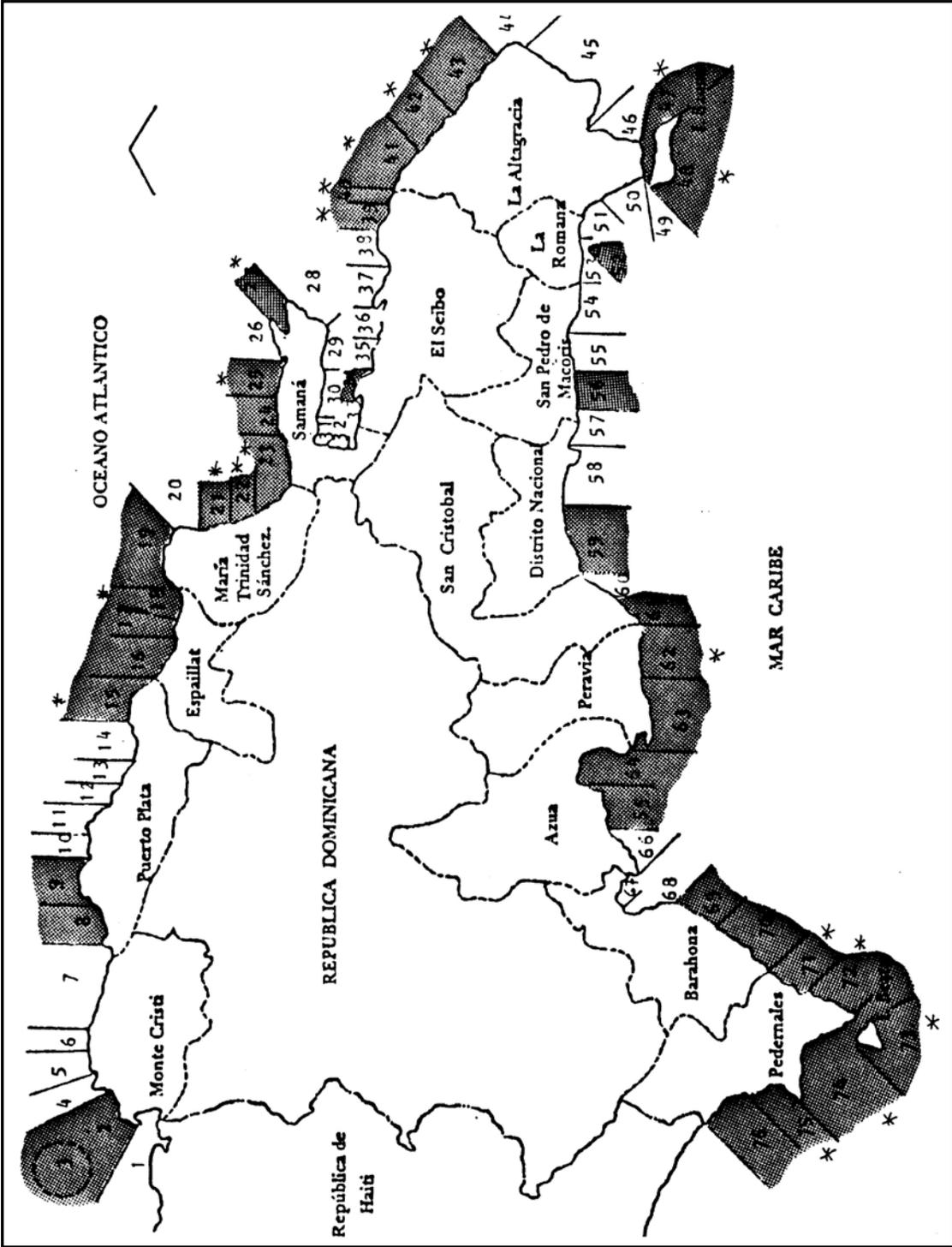


Figure 2.- Coastal areas with important nesting habitats. Relevant areas are marked with an asterisk.

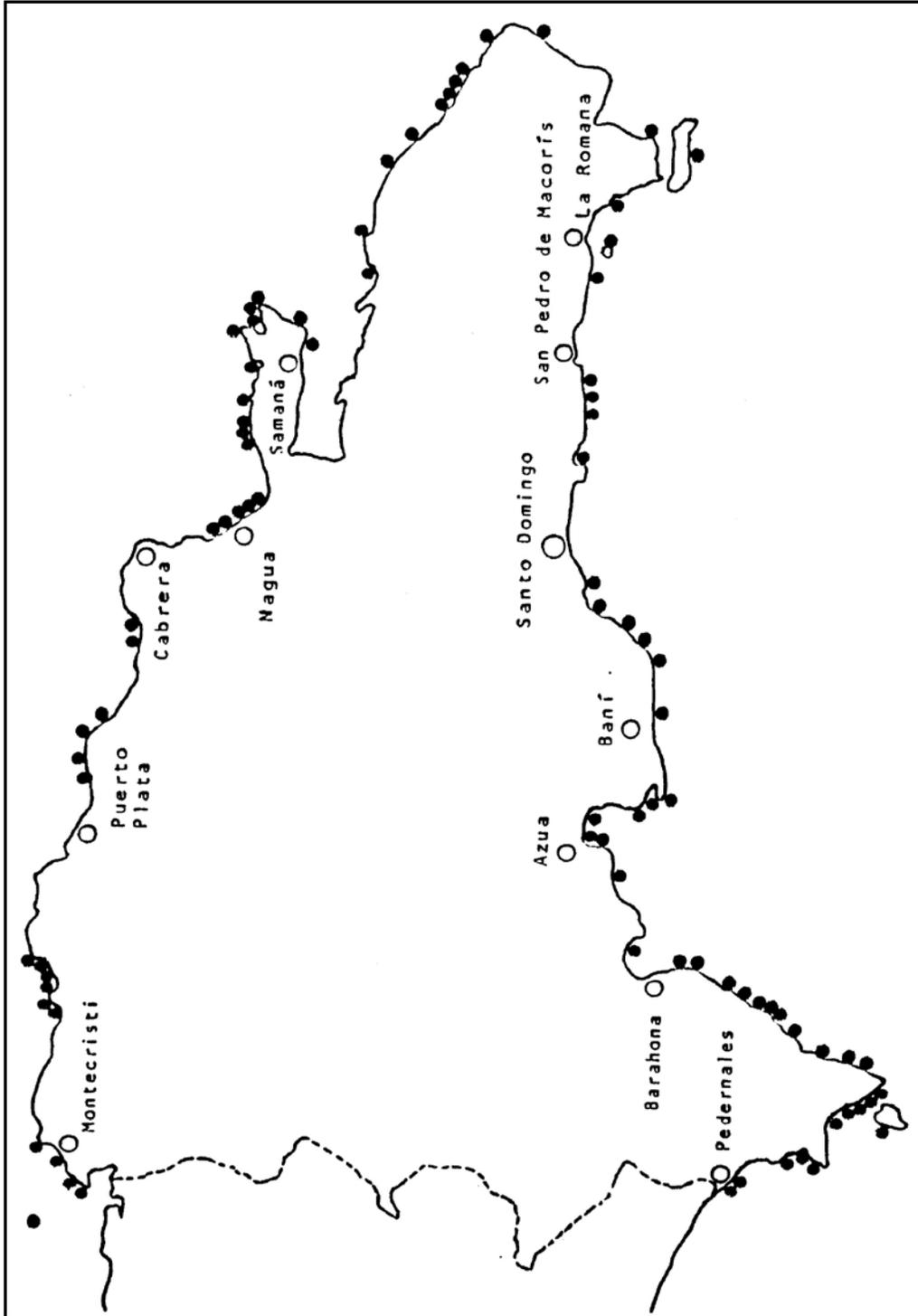


Figure 2A. Map showing location of important nesting beaches identified during the surveys

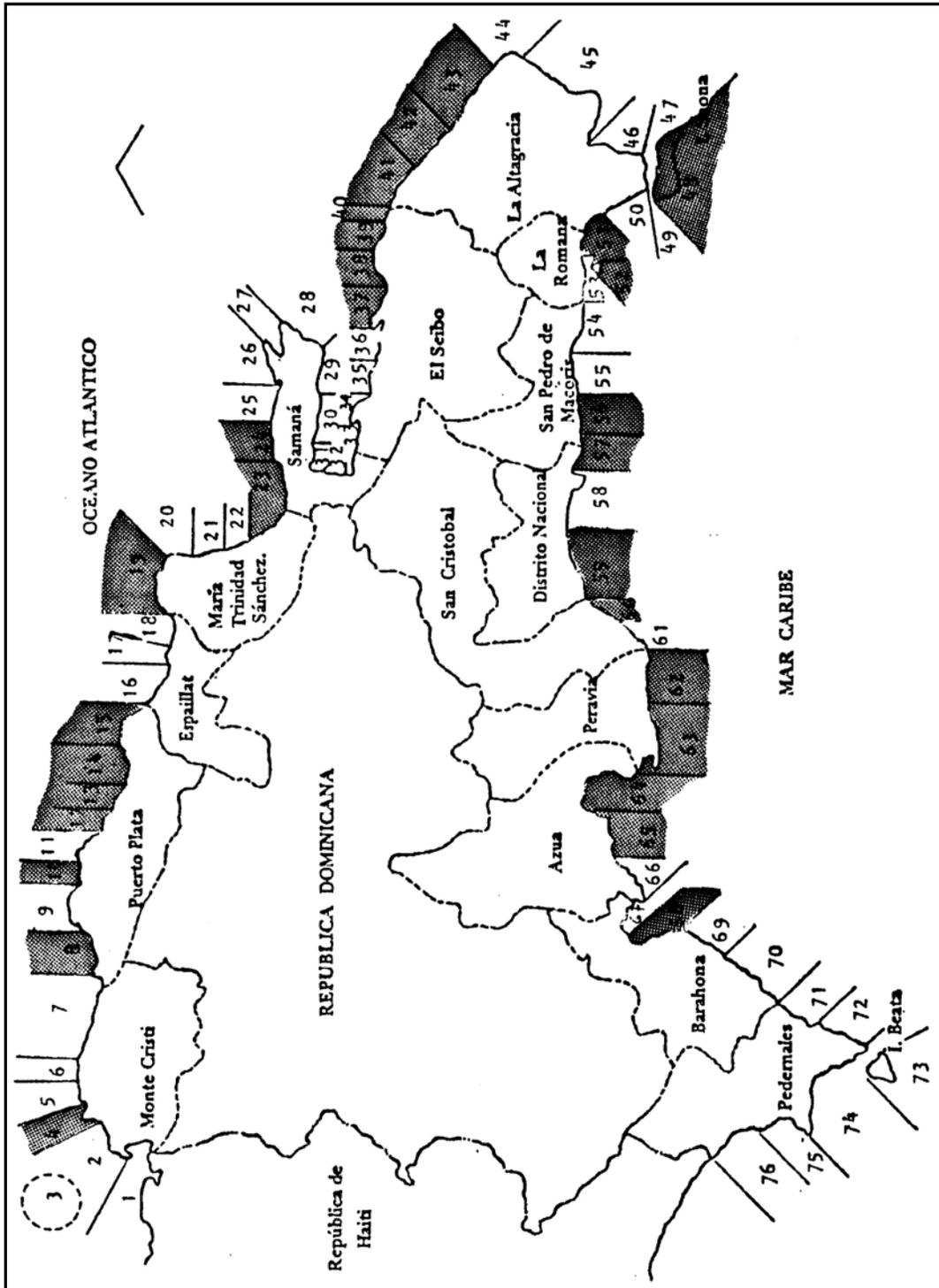


Figure 3. Map showing coastal areas with considerable human impact (shaded areas; tourism, sand extraction, agriculture and other forms of development).

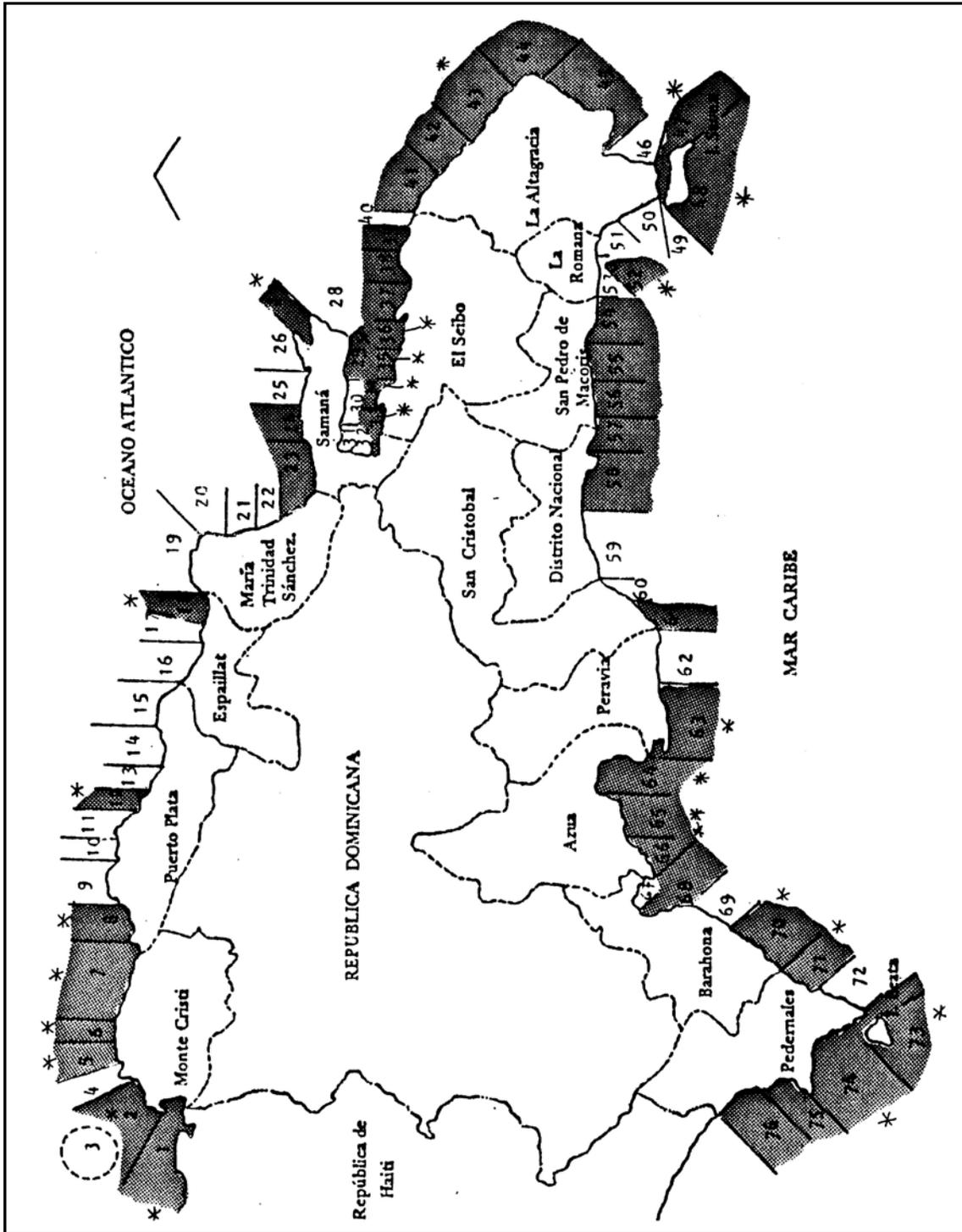


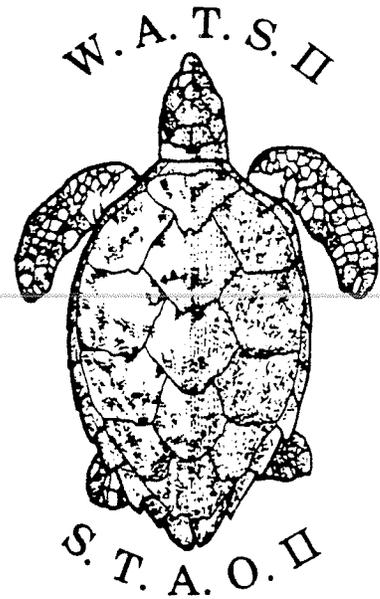
Figure 4. Map showing location of important foraging areas (shaded areas).

# WATS II REPORT/DATA SET

National Report to WATS II for the Dominican Republic

Jose A. Ottenwalder

12 October 1987



**WATS2 072**



SECOND WESTERN ATLANTIC TURTLE SYMPOSIUM

WATS II

Mayaguez, Puerto Rico 11 - 16 October 1987

NATIONAL REPORT FOR THE COUNTRY OF  
DOMINICAN REPUBLIC

Prepared by

Jose A. Ottenwalder\*

September 1987

\*Department of Zoology, Research and Conservation, Parque  
Zoológico Nacional (ZOODOM), P.O. Box 2449, Santo Domingo,  
Republica Dominicana.

# STATUS, EXPLOITATION AND MANAGEMENT OF SEA TURTLES IN THE DOMINICAN REPUBLIC

## 1.- INTRODUCTION

The exploitation of sea turtles in the waters around Hispaniola during colonial times have been well documented by the early european chroniclers. According to their accounts marine turtles were an important resource in the development of the island. Then, the fisheries were heavily supported from turtle stocks. Since then, increasing human populations and growing use of turtle products have stimulated a drastic intensification of the exploitation that probably exceeds the maximum sustainable yield of the resource. The data presented here is summarized from the unpublished report "Exploitation, conservation and management of sea turtles in the Dominican Republic" (Ottenwalder 1987), prepared for the Western Atlantic Turtle Symposium (WATS II) and the National Marine Fisheries Service under contract with the Sea Grant Program and the University of Puerto Rico. We discuss here the results of this survey (ground-truth) as well as previous available data from aerial and ground truth surveys (Ottenwalder 1981, Ross and Ottenwalder 1983) to assess nesting activity, population trends and exploitation levels of sea turtles in the Dominican Republic.

## 2.- METHODS

Ground-truth surveys were conducted along the coastal areas from September 1986 through August 1987 to gather data on nesting numbers, exploitation and critical habitat of sea turtles. Survey methods used are described in detail in Ottenwalder (1981). Additional field surveys were conducted in major tourist markets and selected urban areas to gather information on utilization and commercialization of sea turtle products. To allow comparison of new data with the 1980-1981 surveys, the same coastal section units used for the previous surveys (Fig. 1; see Ottenwalder 1981) were followed to identify important critical habitats for nesting and foraging. The selected reference coastal locations and unit number used were: Bahía de Manzanillo (1) - Punta Presidente (2) - Cayos Siete Hermanos (3) - Boca del Yaque (4) - Bahía de Icaquitos (5) - Punta Bucán (6) - Punta Mangle (7) - Punta Rusia (8) - Punta del Castillo (9) - Bahía de Luperon (10) - Puerto Cambiaso (11) - Boca del Maimón (12) - Puerto Plata (13) - Boca del Camú (14) - Sosua (15) - Boca del Yásica (16) - Boca del Joba Arriba (17) - Punta Gorda (18) - Río San Juan (19) - Cabrera (20) - La Entrada (21) - Boba (22) - Nagua (23) - Punta Bonita (24) - El Limón (25) - Playa del Valle (26) - Cabo Cabrón (27) - Cabo Samaná (28) - Punta Balandra (29) - Punta Los Corozos (30) - Las Garritas (31) - Boca del Yuna (32) - Boca del Barracote (33) -

*Monterey  
1-7*

Bahía de San Lorenzo (34) - Sabana de la Mar (35) - Las Cañitas (36) - Punta Ratón (37) - Miches (38) - Punta Gorda (39) - Punta Limón (40) - Boca del Nisibón (41) - Puerto Escondido (42) - Macao (43) - Cabo Engaño (44) - Punta Cana (45) - Boca del Yuna (46) - Punta Algibe (47) - Isla Saona (48) - Punta Gorda (49) - Punta Catuano (50) - Bayahibe (51) - Isla Catalina (52) - Río Dulce (53) - Boca del Cumayasa (54) - Boca del Soco (55) - San Pedro de Macorís (56) - Guayacanes (57) - Boca Chica (58) - Santo Domingo (59) - Haina (60) - Najayo (61) - Nizao (62) - Playa de Baní (63) - Punta Ocoa (64) - Monte Río (65) - Puerto Viejo (66) - Punta Martín García (67) - Boca del Yaque del Sur (68) - Playa San Esteban (69) - Paraíso (70) - Punta San Luis (71) - Cabo San Luis (72) - Isla Beata (73) - Cabo Beata (74) - Cabo Falso (75) - Cabo Rojo (76) - Pedernales.

### 3 STATUS

#### 3.1 Historical

Representations of turtles are abundant in the pictoric manifestations left by the natives of Santo Domingo on the walls of caves, and in zoomorphic figures on archeological pieces (see Herrera Fritot, 1950). When Columbus anchored offshore Montecristi, on the north coast of Hispaniola, on the 9th of January 1493, he found "many turtles, of which several were taken by the sailors in the Monte-Cristi when the turtles came to land to lay eggs, and they were very large, as a large shield" (Las Casas, 1951; Del Monte y Tejada, 1952). In 1495, the Italian Michele de Cuneo ( in Parsons, 1962; in Salas y Vazquez, 1964) wrote in his observations on Hispaniola of "an infinity of giant turtles, heavy and optimal for eating". Pedro Martir de Angleria (in Parsons, 1962) reported of mass nesting of sea turtles at Alto Velo Island. In the first part of *Historia Natural y General de las Indias*, published in 1535 (Fernando de Oviedo, 1851-1855) there are descriptive references of their abundance, size and nesting. Juan Lopez de Velasco (in Rodriguez Demorizi, 1942) wrote between 1571 and 1574 on the *Geografia de Hispaniola* " ...abundance of turtles in the sea...and in the coast and inlet of Puertohermoso..." (actually Bahía de Ocoa and Playa Salinas). "In the sea grow many turtle,

very large... they also eat them and appraise their meat..." wrote Luis Geronimo Alcocer in 1650, in his *Relacion Sumaria de la Isla Hispaniola* (in Rodriguez Demorizi, 1942).

Esquemeling (1893) described mass nesting of turtles at Isla Saona. His descriptions of the four most common species of sea turtles ("cavana" or loggerhead, "caret" or hawksbill, green and leatherback) were perhaps the earliest accounts about the different turtles found in the area. In the memories the French surgeon M. Saint (in Rodriguez Demorizi, 1973) there are observations on the abundance of sea turtles nesting in Samana Bay. Sanchez Valverde (1785) reported on the "...plentiful number of turtles along the coast of Hispaniola, and their prodigious multiplication by eggs on the beaches...". Additional references are given by Jose de Acosta (1590) and Moreau de Saint-Mery (1796).

The exploitation of sea turtles for food was found to be part of the native culture when Columbus discovered Hispaniola (Fernandez de Oviedo, 1851-1855). Carib Indians used turtle bones as arrowheads (Salas y vazquez, 1964). The Indians employed several techniques to capture sea turtles, including the use of remoras or "peixe reverso" (Fernandez de Oviedo, 1851-1855).

There are numerous accounts of the early exploitation of turtles by Europeans in Hispaniola. Esquemeling (1893) recounts of the seventeenth century "...the most common food is the pork (of pirates and bucaners) ...the next is tortoises, which they accustomed to salt a little..." and (referring to the habitants of Hispaniola) "...they often come and go in their canoes to the Isle of Savona, not too far distant thence, which is their chief fishery, especially of tortoises...". Of this Hispaniolan satellite, actually known as Saona Island, Fray Cipriano de Utrera (in Sanchez Valverde, 1971) quoted "...from where in 1771 some Englishmen dedicated to the fishing of turtles were evicted...". He also described Beata, another Dominican possession, as "...a solitary island in which the Spaniards had some livestock and in their time they collected turtle eggs and seabirds...".

### 3.2 Present Status

Available data indicate that historically abundant populations have been reduced to a remnant of their former size, and that no concentrated nesting occurs today. Although higher density of nesting coincides with two major sections of the coast. Dispersed nesting, particularly by the hawksbill and to some extent the green turtle, occur on any suitable beaches. Results of previous and recent surveys, show that the Dominican Republic is an important nesting area for the leatherbacks, particularly on the northeast and southwestern coast.

Available estimates of the numbers of nesting females represent approximate numbers and suggest only order of magnitude. These <sup>1906-87</sup> estimates suggest that approximately 310 hawksbills, 265 leatherbacks, 225 green turtles and 50 loggerheads might nest annually in the Dominican Republic. Hawksbill and green turtles are encountered in coastal waters throughout the year, while leatherbacks appear only during the nesting season. The loggerhead is observed only occasionally. Because we have observed that a large number of the hawksbills taken by the fishermen (range from dinnerplate to medium size) do not reach the carapace length of nesting females reported from other localities (Carr et al, 1966; Carr and Stancyk, 1975; Hirth, 1980), it is possible that the number of nesting hawksbills is smaller than estimated. On the other hand it is also likely that carapaces of adult specimens are less frequently encountered because they are often sold to the

tortoiseshell dealers directly by the fishermen. Dominican fishermen frequently use the name "carey" as a synonym of all sea turtle species (although they can easily recognize the different species). This has created misunderstandings of data interpretation and official statistics.

Sea turtles in the Dominican Republic are being exploited at an alarming rate and their decline has been obvious to most fishermen. Preliminary studies suggest an even more critical situation in Haiti (Ottenwalder, Unpublished report to WATS). Our knowledge of the turtles nesting on the island is still poor and superficial. More information on their ecology and distribution, particularly that derived from tagging data, should be accumulated before predictions about their fate can be accurately attempted.

4.- CRITICAL HABITAT ASSESSMENT: the extent of beaches, and problems related with nesting access and success.

The nesting habitats for marine turtles in the country is being reduced at an alarming rate. A number of former nesting areas have been converted for development in some cases to the extent that the habitat is no longer suitable for nesting. Several factors are involved. Ranked in order of importance, tourism, sand extraction, and to a less extent, the conversion of beaches for agricultural activities are the major causes threatening the nesting habitats. The extent and location of sea turtle nesting beaches were discussed in detail by Ottenwalder (1981) and *see drawing in Fig 2.*

Nesting habitat is increasingly being claimed for the tourist industry, which is currently considered by both government and private enterprise to be among the highest priorities for development and foreign currency income. Seven major tourist development coastal zones were designated by decree (modifications to Law 153) since 1980. These zones are Santo Domingo - La Romana, Luperon - Cabrera, Macao - Punta Cana, Samana - Las Terrenas, Barahona - Enriquillo, and Montecristi - Pepillo Salcedo. These areas comprise a large proportion of the most important nesting habitat of the Dominican Republic (i.e. Macao - Punta Cana).

Sand extraction could be single out as one of the worst examples of coastal degradation in the country. Scars from past excavations remain throughout the shoreline, resulting in serious erosion and high sediment loads. Sand extraction for use in construction is a serious problem responsible for the destruction of a number of former nesting beaches. There are regulations prohibiting sand and coral extraction, but these are ineffectively enforced. Sandmining is regulated since the promulgation of the Mining Law No. 4550 of October 1956, and has subsequently been modified on several occasions "for the use and conservation of the resource". Regulation 1517 (April 1967) prohibits sand extraction on beaches up to 50 meters of the shoreline. Law No. 123 (May 1971) cancel all concessions (for exploitation of sand on beaches and river banks) in force prior to that date, and establishes a commission to screen request for concessions for its recommendation to the Executive.

Coastal protection have been lost in some coastal areas due to sand extraction, especially in dune habitats near the mouth of rivers. The consequences of modifying protective coastal barriers, such as reefs, dunes and mangrove were noticed during the passage of hurricane David in 1979.

Extensive coconut plantation programs, particularly on suitable nesting sites of the northeast are being promoted and supported by the government's Department of Agriculture.

Although marine pollution does not yet seem a very serious problem, of particular concern is the problem represented by the heavy traffic of oil tankers in the area of the Mona Passage. This passage is adjacent to the northeastern portion of the country, where the highest density of nesting turtles has been estimated. According to the U.S. Environmental Protection Agency a trajectory model of an hypothetical oil spill of 6,000 barrels of crude east of Mona Island indicated that the oil would reach the eastern shore of the Dominican Republic in three days, and would spread as far as La Romana and Laguna Limon in five days. The Dominican Republic lack emergency plans and oil clean-up equipment to handle spills. Playa de los Muertos, and the important beaches between Punta Nisibon and Punta Macao, where perhaps the largest population of leatherbacks nest in the country, is already suffering from oil pollution.

## 5.- EXPLOITATION

### 5.1 Local

Most turtles are taken in coastal waters by divers using spearguns. they are also taken in chinchorros or seine nets, and purse nets, but this type of capture is only incidental. During breeding season, nesting females are caught and killed on the beach and their eggs taken whenever possible, while adult males (and often females) are netted in "folas", nets which bear a floating turtle - shaped decoy that is carved in wood. The "folas" are set to block nesting beaches. Fishermen and "tortugeros" move to fishing camps at remote nesting beaches during the breeding season, to catch turtles and collect eggs. Despite laws regulating their capture, turtles of all sizes and species are taken by the fishermen. Hawksbill and green turtles represent most of the catch in coastal waters. They are taken throughout the year. Loggerheads are taken with some frequency at sea and occasionally while nesting. Because leatherbacks usually approach the coast only during the nesting season, they are primarily taken at that time. They are usually captured on the beach or in "folas", and only rarely harpooned because of their large size. In the past, leatherbacks were generally disregarded as food in a number of coastal areas because the meat is dark, tough, of a strong and not as tasty flavor as the meat of the other species. Their eggs were not in high demand until recently. Actually, because of the scarcity of both green turtles and hawksbills, leatherbacks are utilized as a substitute. Because leatherbacks meat is not well liked, it is often cut into steaks and mixed with hawksbill and green turtle meat before it is sold. In 1980 local prices for turtle meat range from 50 cents/pound in coastal areas, RD\$1-1.50/pound as regular price, to RD\$2.50/pound, depending on the kind of turtle and meat cut. In 1986

prices ranged from \$2.50 to \$7.00.

Use of sea turtle eggs for food is one of the major conservation problems facing turtle populations in the Dominican Republic. Culturally this problem is aggravated by the traditional and erroneous belief that turtle eggs have aphrodisiac qualities. To some extent, the meat is also alledged to be a sexual stimulant. Demand for turtle eggs is therefore high, and the price from the nesting beach to markets in the large cities, can easily increase range from \$0.50 to \$1.50 each. Most beaches on which sea turtles nest, are patrolled at least regularly during the nesting season, by fishermen who look for turtle tracks and dig eggs. If fresh tracks are found the re-nesting date is estimated, usually with good accuracy and the turtle is slaughtered upon her return.

Turtle oil is also extensively marketed. Most of it goes to pharmochemical companies for use in cosmetics. One of these companies began exporting refined turtle oil to the United States during 1980. Locally, turtle oil is sold in public markets, and by private vendors. It is sold at a price ranging from \$5 to \$30 pesos. Pure oil is frequently mixed with other skin creams, butter (for consistency), and "bija" (a vegetable extract that adds color), and vegetable oil. Some sea food

stores also sell half liter bottles at \$30 pesos, <sup>often</sup> mixed with shark oil.

Official capture statistics for sea turtles are not only scarce and incomplete, but insufficiently classified or, in some cases, organized in an ambiguous way. Access to statistics of annual capture of exportation of turtle products is made difficult by the lack of cooperation from both official and private sectors. I present here the available data in order to suggest approximate levels of exploitation. Unfortunately, most of the data has been categorized under "carey" or "turtle" or both, since statistics are not registered by species. It is important to note that most of the turtles killed on the nesting beach, especially near remote coastal settlements are probably not included in the statistics.

INDOTEC (1980) estimated that "only 45 to 70 tons" of sea turtle meat are landed annually in the Dominican Republic. According to the original source of these data (Secretaría de Estado de Agricultura), the capture between 1975 and 1978 was 287 tons, while from 1970 to 1974, only 8 tons were recorded. However, no data is given for the years 1972 and 1973 (Table 1). The capture between 1967-1971 was 35,435 kgs, which included 16,110 kg of "turtle" and 19,325 kg of "carey" (Oficina Nacional de Estadística 1970, 1971). During the last few years the amount captured has increased remarkably according to figures produced by INDOTEC (1980), and the figures reported

by the Secretaría de Agricultura of the total turtle meat produced between 1979 and 1981, when a total of 353,658 kg were reported. Although the recording of the fisheries landings statistics was perhaps deficient until 1975, they show that at least 681,093 kg were landed between 1967 and 1981, with an annual average of 52,392 kg (excluding the years of 1972 and 1973). If we assume that the annual capture for the two missing years was equal to the annual average over the years for which data is available, the total capture from 1967 to 1986 may be estimated as 1,298.737 kg. Because the figures prior to 1975 may be minimum values, this estimate is considered conservative.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Between 1979 and 1981, the fluctuations in total capture of turtles seem to be associated with the nesting season.

In addition to eggs and meat, hawksbill turtles are heavily exploited for their shell. It is the species most valued by the Dominican fishermen. The regulation protecting the species is practically ignored. Raw tortoiseshell from medium to large specimens goes to the local artisans to be worked, and to local or foreign dealers to be illegally exported. Some worked tortoiseshell is also exported. Juvenile and subadult hawksbills are usually stuffed to be sold whole for more money than their tortoiseshell would have brought.

This is because the scutes are too thin and small to be profitably worked. Most carapaces for sale in tourist shops are from small to medium sized turtles, (Table 3). This might suggest the age classes that are most harvested. Adults with very thin scutes are also sold stuffed, or more often, as polished carapaces. According to the size, a stuffed hawksbill sells for \$30-80 (small), \$80-300 (medium), or more (large). Attractive and very large stuffed specimens are sold for as much as \$1,500. A fisherman is paid between \$75-90/pound of tortoiseshell, depending on the quality of the scutes, the region and the dealer. Many fishermen travel to Santo Domingo to look for a better market and to avoid intermediaries. Tortoiseshell is regularly worth \$150 in the market in Santo Domingo.

## 5.2 International

Exportation of raw tortoiseshell from the Dominican Republic has been illegal since January 18, 1967. This regulation was not created to protect hawksbill turtles, but to protect the jobs of a growing number of Dominican artisans by guaranteeing the availability of material. The legal basis of this legislation originated from the large amounts of raw tortoiseshell that was being exported prior to 1967. The exportation of worked tortoiseshell is not prohibited. Considering only the published statistics from importing countries, at least 13,075 kg of raw tortoiseshell has been exported by the Dominican Republic between 1964 and 1986 (Table 4). Although the 1967 regulation does not protect hawksbills within the Dominican Republic, it could be an effective control against the exportation of raw tortoiseshell, inasmuch as the international market is one of the greatest incentives for exploitation.

There is good evidence that raw tortoiseshell is being exported illegally. According to the Japanese imports statistics, 1,352 kg were imported from the Dominican Republic in 1967 and 1,178 kg in 1968 (Table 4). After that year, Japan's records show that no tortoiseshell was imported from the Dominican Republic between 1969 and 1971. Since 1972, illegal exportation to Japan started again, increasing gradually, until 1986 when a total of 569 kg were imported.

Tortoiseshell was also exported from the Dominican Republic to countries other than Japan: 254 kg were imported by Spain in 1976, and 493 kg in 1977, by a country not specified (Mack et al, 1979; Inskipp and Wells, 1979). Therefore at least 5,221 kg were exported illegally from the Dominican Republic since the 1967 regulation took effect. CEDOPEX, the agency responsible for enforcing the regulation in the Dominican Republic, (but also responsible of promoting exportation) certified to us that according to their records no exportation of tortoiseshell between 1974 and 1986 was registered (Appendix ). However, some CEDOPEX officials were aware of the fact that raw tortoiseshell was being exported illegally, and had observed that it was often declared as "personal effects" or "plastic material". According to the information we obtained, exporters deal directly with importers, and only have to declare their shipment to CEDOPEX using the export license issued to them by CEDOPEX. The contents of the shipment are never verified by the agency, since these are functions of the Dominican Customs. There are at least four major tortoiseshell exporters in the Dominican Republic. Other dealers supply it only to local artesany workshops, independent artisans, gift shops and jewelry stores. Dominican tortoiseshell artesany is widespread and diverse.

The volume of tortoiseshell illegally exported each year from the Dominican Republic to Europe under the category of "personal effects" is unknown but is estimated to be

considerable. A major Amsterdam firm that deals in raw tortoiseshell and ivory received two shipments (totalling 251.2 kg) declared as "used personal and household effects" from a Dominican dealer on September (92.1 kg) and November (159.1 kg) of 1980. I also obtained information indicating that the Dominican dealer had sent regular shipments (every 2 or 3 months) to the same firm in Amsterdam since 1977. Tortoiseshell is also exported as part of artisanal or industrial manufacturers (pipes, ornaments, luxury items) but is not properly declared. Worked tortoiseshell is mostly sold to European countries, including CITES signatoires. Records of CEDOPEX show that US\$2,299 worth of tortoiseshell products were sold to France in 1975, and \$606 to the United States in 1976. Tortoiseshell jewelry, artifacts and stuffed turtles are acquired by European tourists (mainly Italian and Spanish) in Santo Domingo. Very few Americans take turtle souvenirs home with them since the regulations were established that forbid its entry into the United States. The Dominican Republic recently became a party member of CITES.

## Summary of Exploitation

- 1) Turtles of all species regardless of their size are taken whenever possible.
- 2) According to data gathered from interviews with fishermen, sea turtles are today captured only occasionally. Frequency of captures ranges from one turtle/week to one turtle/three weeks. Between 1000 to 2000 turtles of all sizes and species are presumably taken every year. Reportedly, 70% of the turtles captured are hawksbill and greens.
- 3) Considering that between 1964 and 1986 the Dominican Republic exported at least 13,075 kg of tortoiseshell to Japan and some European countries, we estimate that at least 6,500 hawksbills have been taken during that period in Dominican waters for the international trade alone.
- 4) Reportedly, an estimated 600 kg of the tortoiseshell is utilized every year in the Dominican Republic. Since the fisheries of hawksbill turtles has dropped considerably during the past ten years, about 60 to 70% of the tortoiseshell utilized is imported from St. Marteen, Panama and The Bahamas. Small amounts are also obtained from Haiti (through the border), Cuba (at sea) and even from Puerto Rico (smuggled in the trunks of cars transported in the ferry that serves the route between P.R. and D.R.
- 5) Reportedly, exports of tortoiseshell to Japan is no longer as attractive as it used to be in the past. According to the dealers, the local market, including the tourist market

for worked bekko (particularly Canadians, Italians and Spanish) is far more profitable.

- 6) The Dominican Republic was only a moderate source of bekko, and a minor source of other tortoiseshell and worked bekko for Japan between 1970 and 1986 (Millike and Takunaga, 1987).

## 6.- FISHERIES INFRASTRUCTURE

### 6.1 Socioeconomic aspects

After several centuries of exploitation, the reduced sea turtle stocks of the Dominican Republic retain today, their great value as subsistence and income for an increasing human population. Demand for sea turtle products, stimulated by social and economic problems, as well as by higher prices in both local and world markets, is now assisted by modern technology. With the decline of marine turtles on nesting beaches, exploitation has been gradually concentrating in coastal waters. This has been facilitated with the availability of scuba equipment, outboard motors and larger fishing boats, allowing the hunting of sea turtles in coastal lagoons, reef systems and offshore banks to be more efficient.

The distinction between subsistence hunting and commercial exploitation in the Dominican Republic is not easily made. Most fishermen are very poor. One sector works independently, or in small groups. Another sector is associated in cooperatives that either are owned by the fishermen, or are organized and supported by IDECOOP (Instituto de Desarrollo y Credito Cooperativo). A third and important one is organized by patrones de pesca who loan the fishermen whatever gear they need (boats, motors, scuba, harpoons and spearguns, compressors, lines, nets and diving gear). Under this latter arrangement the fishermen

are compromised to sell the harvest to their patrons, although they are in most cases allowed to keep some of their catch for their own consumption. The criteria by which the price for the different sea products is established is variable and very often imposed by the patrones. The prices are also influenced by other factors, such as the distance the refrigerated trucks and boats must travel to reach the fishing camps or villages.

Some of the "patrones" control operations of regional importance, and over hundred fishermen may work for them. The patrones might sell their products to intermediaries, or directly to sea food distributors or exporters. In any case, intermediaries are involved in every step, and prices rocket after reaching wholesale dealers (i.e. tortoiseshell, lobster). in this socioeconomic context, the most common philosophy behind legal enforcement can be summarized as follows: a fisherman found taking eggs or killing turtles illegally is fighting for his subsistence and too poor to be punished. On the other hand, dealers, from patrones to firm owners, are too important, to be bothered by fisheries inspectors, and therefore to be reached by the law. Fishing cooperatives, which are the best alternative to protect fishermen from exploitation, are for the most part poorly organized and lack technical advice and economical support. None of these sectors take sea turtle legislation seriously.

## 6.2 Fishing fleet and equipment

The fishing fleet is estimated to consist of 2,356 units, dominated by 1,156 "yolas" (49%) which measure 3-6 m in length, and 991 dugout-canoes or "cayucos" (42%) which are between 4-6 m in length. Boats (169) ranging in length from 4.6-7.3 m represent 7% of the total, while fishing ships (37) with a length of over 7.6 m represent the remaining 2%. Seventy-two percent (830) of the yolas, 13% (131) of the cayucos, 78% (131) of the boats, and all of the ships are motorized (INDOTEC, 1980). The major fishing zones are associated with the wider shelf areas and submerged banks including Banco Monte Cristi (892 km<sup>2</sup>), Bahia de Samana (858 km<sup>2</sup>), Cabo Engaño (772 km<sup>2</sup>), San Pedro de Macoris (463 km<sup>2</sup>), Bani-Barahona (858 km<sup>2</sup>) Banco Navidad (772 km<sup>2</sup>) and Banco de la Plata (1,955 km<sup>2</sup>).

## 8.- REVIEW OF SEA TURTLE SURVEYS AND RESEARCH PROJECTS

### 8.1 Past surveys and research

Very little was known about the status and distribution of sea turtles in the Dominican Republic before the 1980's (see Ingle and Smith, 1949; Rainey and Pritchard 1972; Rebel, 1974; Bacon 1975) and with the exception of a few isolated reports (Ottenwalder and Sanlley, 1976, 1980; Ottenwalder, 1980) published data about nesting species before that date is virtually nonexistent.

On August 1978 Thomas Carr visited the country to conduct field surveys and interviews as part of the surveys of sea turtle populations and critical habitats in the Western Atlantic. The results of his observations were summarized by Carr et al (1982).

Systematic studies started during 1980 when two survey and research projects were conducted. The status and population size of the nesting population of the leatherback turtle were investigated between March 24 and April 13 (Ross and Ottenwalder 1983). A second project, developed during 1980-1981) was conducted with the support of the Caribbean Conservation Corporation and the National Marine Fisheries service on behalf of the Western Atlantic Turtle Symposium (WATS I). This project generated data on status, distributions, nesting

activity, population estimates and critical habitat (nesting, foraging and developmental) of nesting species (Ottenwalder 1981). A tagging and hatching program was also started that year in the Barahona Peninsula at Mosquea, San Luis and Inglesa beaches (Ottenwalder 1981, Ottenwalder y Inchaustegui, MS) with support from the Caribbean Conservation Corporation, the Parque Zoologico Nacional (ZOODOM) and the Museo Nacional de Historia Natural. Leatherback, hawksbill and green turtles have been tagged and successfully hatched in this program. Hatchlings are released on the beach soon after hatching. So far, most turtles hatched have been leatherbacks, with hawksbills second in number.

## 8.2 Present and planned surveys and research

At present a survey to re-assess nesting numbers and to document exploitation levels of sea turtles and their products in the Dominican Republic is being concluded (Ottenwalder this report, and manuscript in preparation). The investigation was conducted under contract with the Sea Grant Program and the University of Puerto Rico on behalf of the Western Atlantic, Turtle Symposium (WATS II).

Conservation/research projects and integrated conservation/development oriented programs have been planned and defined, but these have been hampered by lack of funds locally.

## 9.- LOCAL MANAGEMENT/CONSERVATION AGENCIES

The Departamento de Recursos Pesqueros (Subsecretaría de Recursos Naturales, Secretaría de estado de Agricultura) is the government authority responsible for the management of both freshwater and marine wildlife, and as such, the agency responsible for enforcing sea turtle regulations. Traditionally, the major emphasis of the DRP has been to promote the development of government and private aquaculture programs, neglecting the management and conservation of native wildlife.

Other agencies involved and/or interested in management of sea turtles are:

- 1) Dirección Nacional de Parques  
Apartado 2487  
Santo Domingo, República Dominicana.  
Tel; 685-1316
- 2) Parque Zoológico Nacional (ZOODOM)  
Apartado 2449  
Santo Domingo, República Dominicana.  
Tel: 562-3149
- 3) Centro de Investigaciones de Biología Marina (CIBIMA)  
Universidad Autónoma de Santo Domingo, (UASD)  
Santo Domingo, República Dominicana
- 4) Centro Dominicano de Promoción de exportaciones  
(CEDOPEX), Apartado 199-2  
Ave. 27 de Febrero  
Santo Domingo, República Dominicana.  
Tel: 566-9131.

- 5) Fundación Dominicana Pro-Investigación y Conservación  
de los Recursos Marinos, Inc. (MAMMA)  
Santo Domingo, República Dominicana,  
P.O. Box 21449.  
Tel: (809) 689-3128.

## 10.- LEGISLATION

The first legislation protecting sea turtles in the Dominican Republic was promulgated on June 28, 1938 (based on Ley de Pesca No. 5187). Since then, several laws and decrees concerning sea turtles have been legislated. At present the regulations in force are the Ley de Pesca No. 5914 (May 1962) and the Decree No. 314 of October 1986. The text of the current regulation is translated below.

Art. 1.- The capture and commercialization of marine turtles which do not reach the following sizes is prohibited:

Scientific Name	Common Name	Carapace length
a) <u>Chelonia mydas</u>	Tortuga verde	90 cm
b) <u>Eretmochelys imbricata</u>	Carey	71 cm
c) <u>Dermochelys coriacea</u>	Tinglar	152 cm
d) <u>Caretta caretta</u>	Catuano/Caguamo	152 cm

Paragraph.- The capture of all females nesting or out of the water is prohibited regardless of its size.

Art. 2.- All violations of the present decree will be punished as provided in Article 47, letter c) of the Law No. 5914 of 22 May 1962.

## 11.- MANAGEMENT: DISCUSSION AND RECOMMENDATIONS

The difficulties of assessing the size of sea turtle populations (Bustard, 1979; Meylan, 1982), are complicated by the fact that tag returns (recapture rates of tagged females) are affected by a number of factors, which influence the interpretation of fluctuations of nesting populations. Furthermore, ignorance of sex ratios at hatching or maturity, and age structure, prevents extrapolation of nesting females to total populations. The time required to reach sexual maturity, and the average number of nesting seasons that a given adult female will survive are again unknown. Captive turtles grow and mature quickly, as shown by studies of green turtles (Witham, 1970), hawksbills (Witzell, 1980) and loggerheads (Nuita and Uchida, 1982), but this situation seems directly related to movement restriction, the quality and quantity of food and to water temperature. Under natural conditions, maturation size appears variable (Carr and Carr, 1970) and growth rates are much slower, suggesting (at least for green turtles) that sea turtles require in excess of 30 years to reach minimum breeding size (Limpus, 1980). Therefore it is possible that the effects of exploitation, or conversely of conservation measures (shown by numbers of nesting adults) will only be evident after a number of years. So far, there is no confirmed evidence of nesting in the wild, anywhere, by turtles produced thru

manipulation of eggs and hatchlings (i.e. artificial incubation, egg and hatchling transplant, headstarting) and released for restocking.

Population censuses from only a few years back are not enough to base any conservation management practices. Carr et al (1978) showed that striking seasonal variation in the number of nesting (green) turtles could be expected. Their data, which reports on 22 years of tagging at Tortuguero, Costa Rica, also estimated that the average number of nests per female per season is 2.8 rather than previous estimates of 3 to 7 (Hirth, 1971). Similar fluctuations are detectable in demographic and population modeling studies (Richardson, et al, 1978; Marquez and Doi, 1973; Bjorndal, 1980). Low survival rates of adults and hatchlings in a green turtle rookery under exploitation suggested the extinction of the population within 40 years (Bjorndal, 1980), as man-induced mortality of adults, hatchlings and eggs prevented reproductive output and recruitment.

#### RECOMMENDATIONS AND MANAGEMENT OPTIONS

##### 1) Species management

The existing regulations which protect sea turtles in the Dominican Republic are not adequate, and some modifications and additions are strongly recommended. Based upon available

reproductive data for the four species that nest in the country (Ottenwalder, 1981, 1986) the closed season should extend from late March to November. Considering a) the decline of turtle populations and reduction of their nesting habitats since historical times, and b) current trends of exploitation, a total ban is recommended for all species. Since in the Dominican Republic a total ban on sea turtle exploitation would not have much chance of success. at least not under the present socio-economic conditions and law enforcement structure, only subsistence harvest is to be allowed during non-closed season. The use of "folas" and spearguns to kill or capture sea turtles should be prohibited. The current regulations must be modified also to provide protection to nests and eggs on nesting beaches. Commercialization of sea turtle products should be totally prohibited.

A rigid closed season is necessary if sea turtle population are to be saved from extirpation. During the closed season, protection should include both nesting and internesting habitats. During the open (non-breeding) season harvesting in feeding and development habitats should be permanently banned in designated sanctuaries (see Habitat Protection). Inforcement of the law must be improved to increase the survival rates of eggs and hatchling, and particularly of breeding adults, which represent the fraction

of the population with the highest reproductive value. We strongly recommend the modification of Decree No. 314 of 1986 to read as follows: " The capture, killing, possession and commercialization of leatherback, green, hawksbill and loggerhead turtles with a carapace length (straigh line) of more than 60 cm is prohibited along the coasts and territorial waters of the Dominican Republic".

2) Habitat protection

A major portion of the remaining breeding sites for each species should be covered by strong habitat conservation legislation to ensure that turtles have the necessary beaches for nesting, that disturbance of the nesting adults and their eggs is minimized, and that the hatchlings successfully disperse from these beaches. The local Department of Fisheries Resources should initiate a coordinated action with other divisions of the Ministry of Agriculture, as well as with the Ministeries of Tourism and Minery. This kind of coordinated affort should allow better planning and use of coastal resources to reduce or prevent further destruction of nesting habitats. The goal of sea turtle habitat protection should be to protect the turtles while permitting activities not detrimental to the turtles. Controlled tourism in certain areas can have positive conservation value through a well planned environmental education program. Sand and coral extraction are regulated

by law and authorities must be encouraged to enforce these statutes.

The designation of reserves or marine sanctuaries for sea turtles is considered critical to guarantee the maintenance of populations. As feeding and development areas, we propose the waters of Cayos Siete Hermanos, B de Manzanillo, B. de Montecristi, B. Icaquito hasta B. de la Isabela, B. Escocesa, B. de Rincon, B. de San Lorenzo, Puerto Icaico hasta Cabo San Rafael, Bahia Catalinita, Isla Saona, Isla Catalina, Boca de Yuma, B. Calderas, B. Ocoa, Puerto Viejo, B. Neiba, Puerto Bello, P. San Luis a Cabo Mongon, Canal de Beata y Bahia de las Aguilas. As nesting habitats, we recommend the beaches of Punta Rucia, La Ermita, Bahia Escocesa, Punta Nisibon to Boca del Maimon, Cabo San Luis to cabo Mongo, Cabo Beata to Cabo Falso, Bahia de las Aguilas, Isla Beata, and Isla Saona.

### 3) Incidental catch

There is no evidence to support that incidental catch of sea turtles might represent a significant fraction of the capture.

4) Subsistence harvest

The demographic, economic and cultural implications of sea turtle conservation, are common elsewhere and have been discussed for the Indian Ocean by Frazier (1975, 1979, 1980), and for the Caribbean coasts of Central America by Nietschmann (1979, 1982). Subsistence hunting is an important factor to consider. Although the original native populations of the West Indian islands disappeared during the development of the colonial system, they were soon replaced by other cultures that have also been heavily exploiting the islands wildlife resources (Westermann, 1952, 1953). This is a delicate issue. The implementation of this sort of program will require socio-economic baseline studies on coastal areas that are no yet available. Additionally its success will depend on the amount of manpower available for the monitoring of harvest levels. However, subsistence harvest could also represent a potential source for the black market of sea turtle products.

5) Commercial harvest

Basic research on natural history parameters (e.g. turtle standing crops in reef communities, recruitment, growth rates, and dispersal patterns) of sea turtle populations in Hispaniolan waters is needed before acceptable harvest rates

and quotas could be advised to government and private fisheries sectors. Since the determination of parameters such as reproductive life expectancy and recruitment rates could not be available in the short term, the research needed is long term but without it we cannot plan for sustained yield harvests. Therefore, commercial exploitation must be strictly controlled and exportation of any turtle product prohibited.

6) Fisheries in international waters

Dominican fishermen are known to fish turtles in the Turks and Caicos Islands and in Bahamian waters, exploiting turtle stocks out of the Dominican Republic's territorial sea, this is a controversial area due to the overlap of assumed "exclusive economic zone" (200 nautical miles) of different islands. International conventions and agreements, including migratory species, in the case of exploitation in international waters, or CITES, on the trade of wildlife are the appropriate regulations which deal with this problem. The Dominican Republic recently became a party member of CITES.

7) Management oriented research and conservation

The options to conserve sea turtles in the Dominican Republic are influenced by many factors, but particularly, by our limited knowledge of sea turtle biology. In addition to the little known data on population dynamics, no solid clue is yet available elsewhere about other factors such as the "lost year" of hatchlings (Carr, 1980; Witham, 1980) and the migratory patterns of different life history stages (Juvenile to adult). To manage sea turtles rationally, more studies need to be done in the Dominican Republic. The best strategy in the immediate future is to concentrate efforts on research, protection of existing populations, and development of conservation practices.

Studies on general biology of sea turtles, distribution, utilization of feeding and developmental habitats, and structure of the population are highly desirable, although, if funds are limited, priority should be given to the assessment of nesting populations through tagging projects and systematic field surveys. The two areas with higher nesting densities are recommended as sites for systematic tagging projects. Since the nesting populations are declining, special attention must be paid to investigate the sources of mortality affecting the breeding adults. At present, the only conservation program contemplated is the operation of hatcheries in areas of heavy poaching, predation

or erosion. However, the removal of eggs from natural nests should not be undertaken if unjustified.

Turtles are vulnerable species. It is of both, government and public concern and responsibility to protect this important resource on behalf of maintaining future options for the Dominicans to come. Under the actual trends of sea turtle exploitation any effort to enhance conservation, could not make their situation worse, but only improve it.

Table 1 .- Total landings of sea turtle meat ("carey and tortuga") in the Dominican Republic between 1967 and 1986.

YEAR	SEA TURTLE MEAT	
	HARVEST REPORTED (Kg)	SOURCE
1967	11,428	a
1968	16,127	a
1969	4,609	a
1970	2,942	a
1971	329	a
1972	NA	
1973	NA	
1974	5,000	b
1975	66,000	b
1976	45,000	b
1977	47,000	b
1978	129,000	b
1979	94,180	c
1980	122,578	c
1981	136,900	c
1982	51,704	a
1983	98,571	a
1984	51,970	a
1985	44,960	a
1986	41,768	c
TOTAL	1,298,737	

SOURCES: a) Oficina Nacional Estadística (1970, 1971, 1986)  
b) INDOTEC (1980)  
c) Departamento Recursos Pesqueros (Annual Reports)

Table 2.- Exploitation intensity, expressed as total production of sea turtle meat (in Kg), per month, in the Dominican Republic, 1979-1981.

MONTH	1979a	1980b	1981b	TOTAL (MEAN)
Jan	15,680	3,835	5,851	25,4 (8,5)
Feb	7,550	3,747	4,181	15,5 (5,5)
Mar	5,086	6,604	4,166	15,9 (5,3)
Apr	6,751	20,544	15,085	42,4 (14,1)
May	6,807	21,945	5,425	34,2 (11,4)
Jun	8,314	22,373	19,930	50,7 (16,9)
Jul	8,488	9,201	7,645	25,3 (8,4)
Aug	8,619	26,841	11,512	46,9 (15,6)
Sept	1,897	41,429	7,727	51,1 (17,0)
Oct	NA	6,197	23,469	29,7 (14,8)
Nov	NA	11,528	31,917	43,4 (21,7)
Dec	NA	15,928	NA	- -

SOURCES: a) Oficina Nacional Estadística (1980)  
b) Departamento Recursos Pesqueros (Annual Reports)

Table 3.- Survey of sea turtle carapaces and shell products recorded in markets and tourist shops of Santo Domingo during August 1987

SIZE CLASS (cm)	NO. OF CARAPACES			TOTAL	PERCENT
	Eretmochelys	Chelonia	Caretta		
20	0	0	0	0	0
20-30	22	3	0	25	17.2
30-50	79	18	0	97	66.9
50-70	6	3	0	9	6.2
70-90	3	4	1	8	5.5
90	0	4	2	6	4.1
TOTAL	110	32	3	145	
%	75.9	22.1	2.1		

Table 4.- Japanese imports of bekko and other tortoiseshell (kg) from the Dominican Republic, 1964 to 1986, recorded in Japanese Customs statistics. Line indicates year of regulation prohibiting exportation of bekko. Asterisk indicates additional exports of bekko to countries other than Japan.

YEAR	Bekko		Other tortoiseshell
	Worked	Unworked	
1964		1,767	
1965		1,594	
1966		1,820	
<u>1967</u>		1,352	
1968		1,178	
1969		-	
1970		-	
1971		-	
1972		62	
1973		4	
1974		11	
1975		31	
1976*		113	
1977*		507	
1978*		-	62
1979*		219	
1980*		534	
1981		357	44
1982		872	
1983	3	248	
1984	28	636	
1985		203	
1986		569	
TOTAL	31	12,077	106

SOURCES: Mack, Duplaix and Wells (1979); Japan Exports and Imports, Commodity by Country (1974-1981); Milliken and Tokunaga (1987).

## APPENDIXES

EXPORTACIONES EN KG. Y VALOR DE LOS SIGUIENTES  
PRODUCTOS PARA 1974-1981

AÑO	CONCHA Y UÑA DE CAREY		CAREY		ACEITE DE TORTUGA	
	Peso Bruto KG.	Valor FOB RDS	Peso Bruto KG.	Valor FOB RDS	Peso Bruto KG.	Valor FOB RDS
1974	-	-	-	-	3,694	1,429
1975	-	-	4,634	4,478	-	-
1976	-	-	3,853	3,270	-	-
1977	-	-	7,099	5,200	100	180
1978	-	-	-	-	-	-
1979	-	-	1,554	1,535	-	-
1980	-	-	2,858	5,400	-	-
1981	-	-	3,426	5,477	-	-

FUENTE: CEDOPEX - Unidad de Estadística

NOTA: Como se aprecia en el cuadro no se han registrado exportaciones de concha y uña de carey, no hay más cifras exportadas como subproducto del carey.

PFB/mz.-

Santo Domingo, D. N.  
23 de junio de 1982.

.- Exportation of marine turtle products from Dominican Republic 1974-1981, reported by CEDOPEX, showing no official records of exportation of tortoiseshell.

EXPORTACIONES NACIONALES DE TORTUGAS MARINAS (CAREY Y/O TORTUGA) Y DERIVADOS

1976-1986  
(Valor en US\$)

AÑOS	CAREY		ACEITE DE TORTUGA		CARNE DE TORTUGA	
	Kilos	Valor	Kilos	Valor	Kilos	Valor
1976	3,853	3,270	-	-	-	-
1977	7,099	5,200	100	180	-	-
1978	-	-	-	450	-	-
1979	1,554	1,535	-	-	-	-
1980	2,858	5,400	-	-	-	-
1981	3,426	5,477	-	-	-	-
1982	4,294	6,471	-	-	-	-
1983	651	1,014	-	-	146	221
1984	-	-	-	-	8	100
1985	454	460	-	-	-	-
1986	1,193	1,800	-	-	-	-

FUENTE: CEDOPEX.

DL/yg

Santo Domingo, D.N.  
24 de agosto de 1987

EXPORTACIONES NACIONALES DE CAREY POR PAISES DE DESTINO

1976-1986

(En US\$)

AÑOS	Puerto Rico		Guadalupe y Dep.		Martinica		Francia		Saint Marteen	
	Kilos	Valor	Kilos	Valor	Kilos	Valor	Kilos	Valor	Kilos	Valor
1976	3,853	3,270	-	-	-	-	-	-	-	-
1977	7,099	5,200	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-	-	-
1979	908	860	646	675	-	-	-	-	-	-
1980	-	-	-	-	2,858	5,400	-	-	-	-
1981	-	-	592	979	2,834	4,498	-	-	-	-
1982	2,996	4,650	45	150	499	605	714	866	40	20
1983	-	-	236	399	141	169	274	446	-	-
1984	-	-	-	-	-	-	-	-	-	-
1985	454	46	-	-	-	-	-	-	-	-
1986	1,193	1,800	-	-	-	-	-	-	-	-

FUENTE: CEDOPEX.

DL/yg

1 de octubre de 1987

EXPORTACIONES NACIONALES DE CARNE DE TORTUGAS POR PAISES DE DESTINO  
DURANTE EL PERIODO 1983-1984  
(VALOR EN US\$)

P a í s e s	1983		1984	
	Kilos	Valor	Kilos	Valor
Estados Unidos	-	-	8	100
Francia	126	191	-	-
Martinica	20	30	-	-

Fuente: CEDOPEX

ACEITE DE TORTUGA

Las exportaciones de aceite de tortuga fueron realizadas, en su totalidad, hacia el mercado de los Estados Unidos,

DL/rc

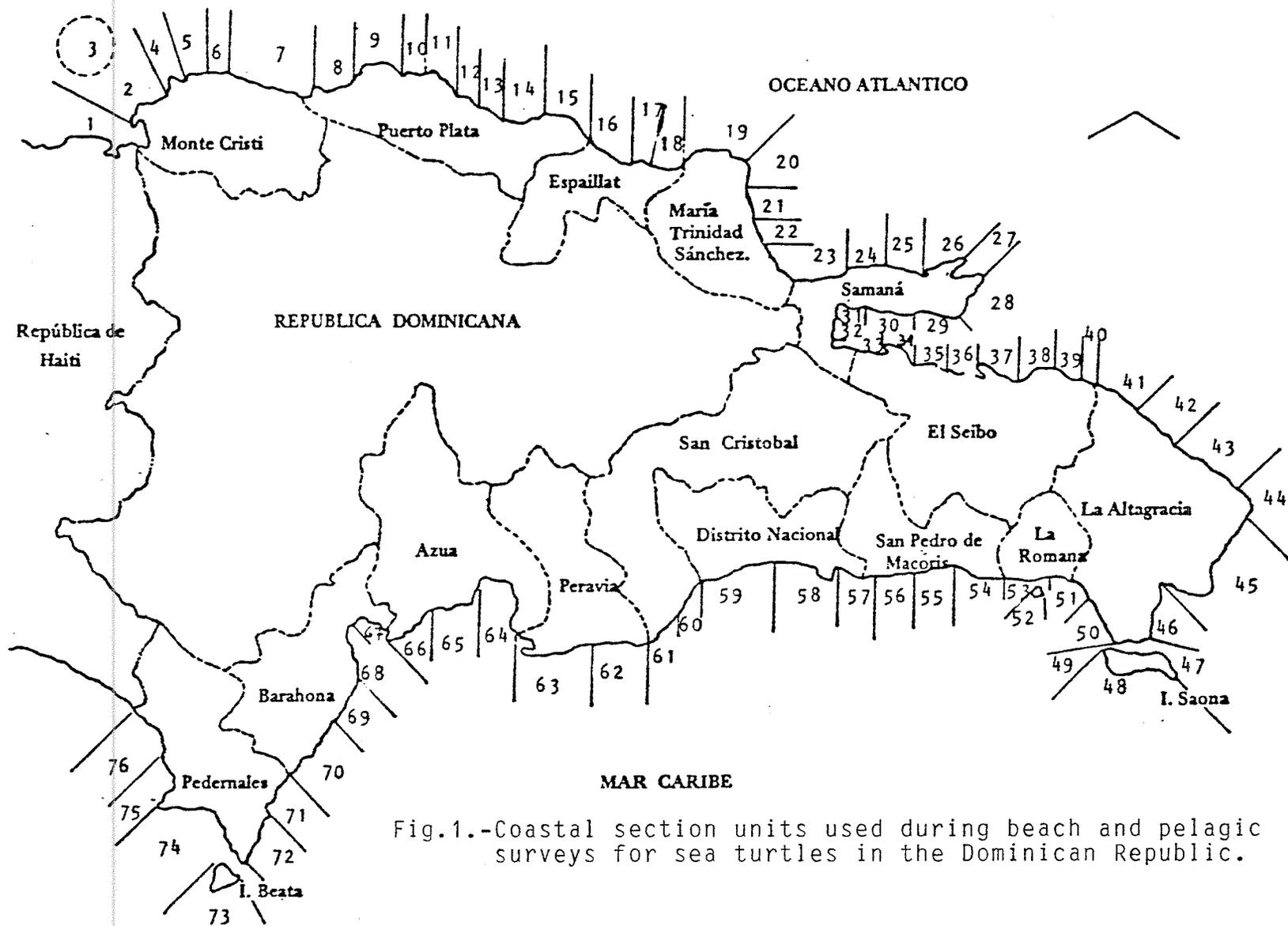


Fig.1.-Coastal section units used during beach and pelagic surveys for sea turtles in the Dominican Republic.

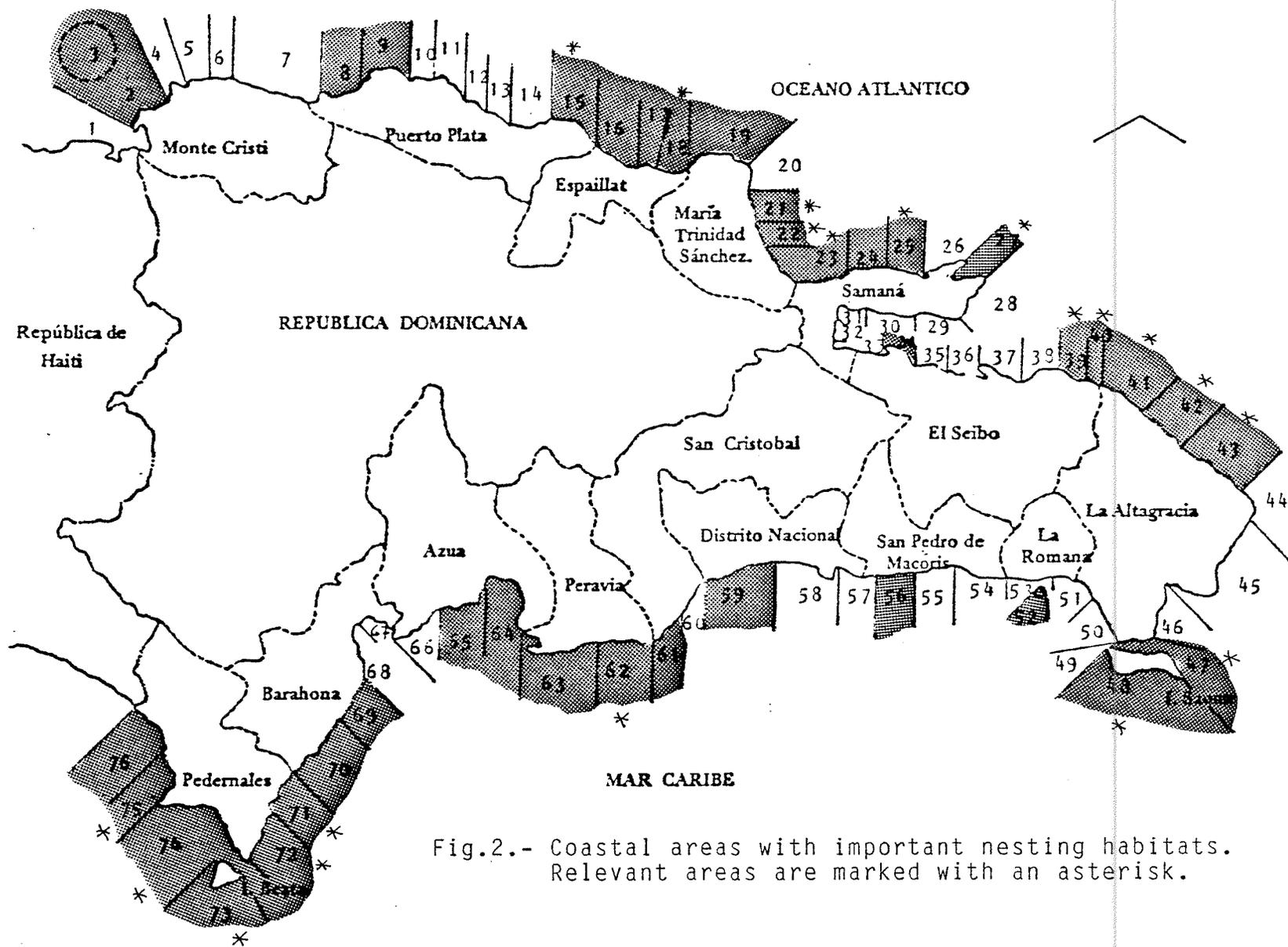


Fig.2.- Coastal areas with important nesting habitats. Relevant areas are marked with an asterisk.

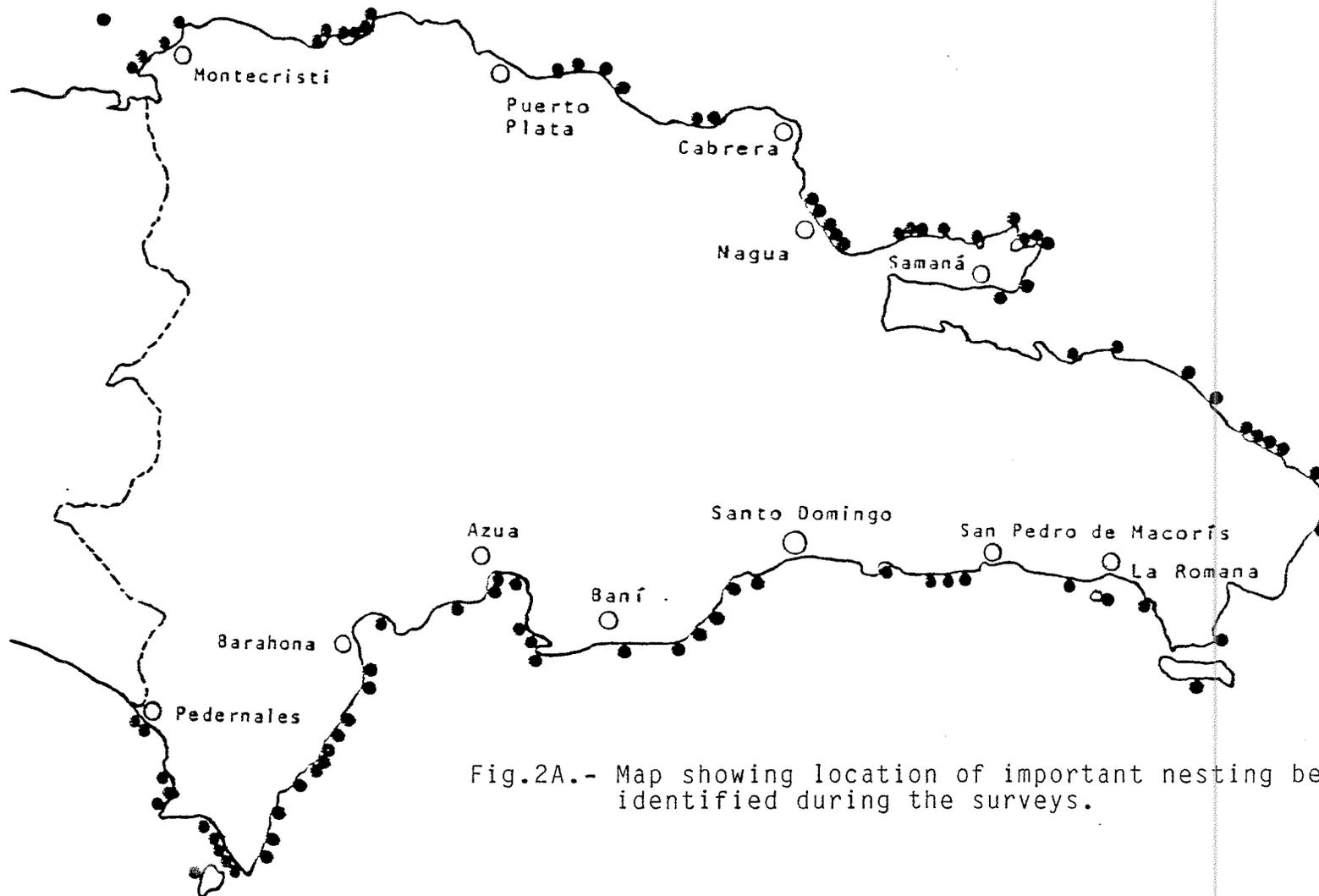


Fig.2A.- Map showing location of important nesting beaches identified during the surveys.

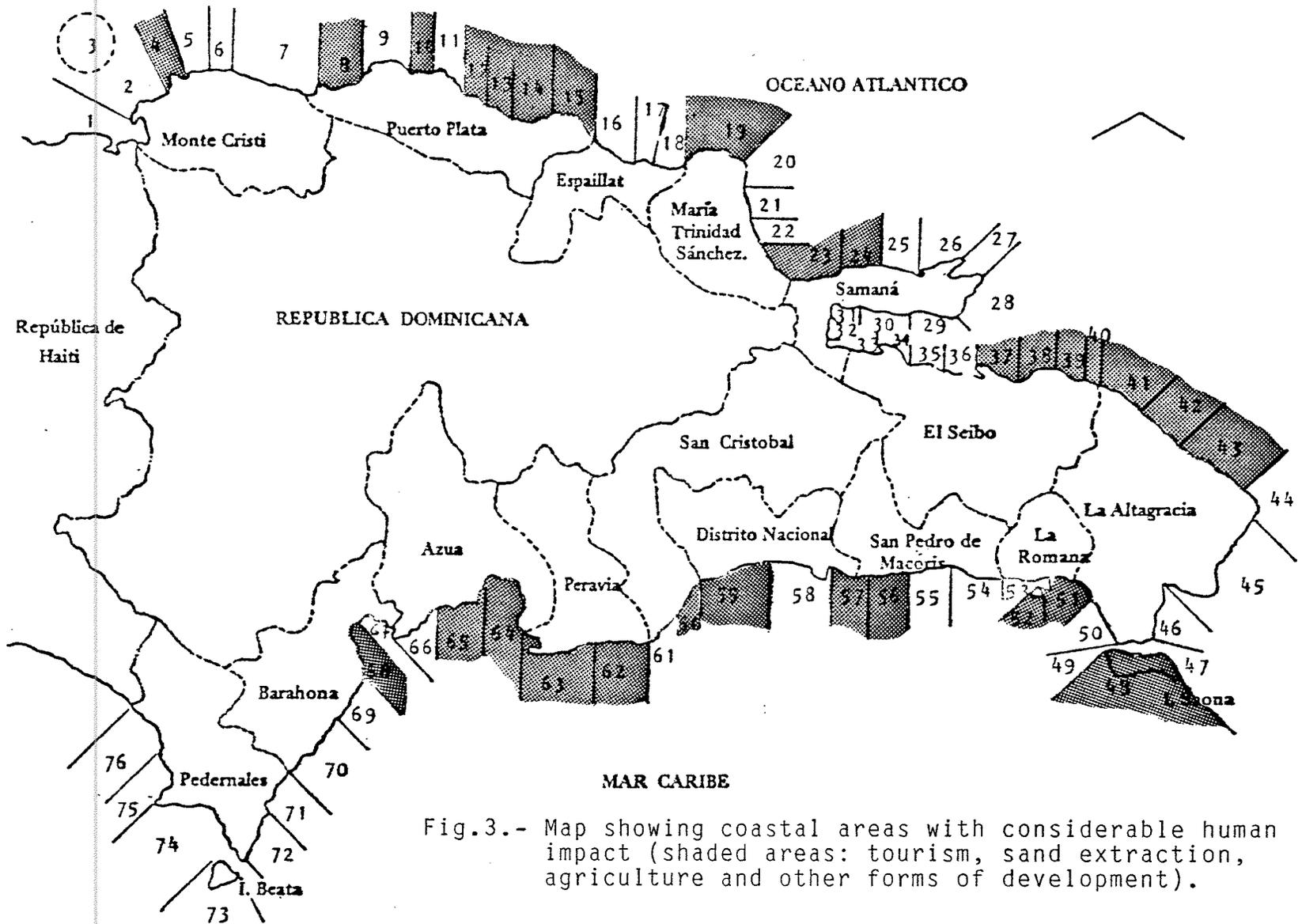


Fig.3.- Map showing coastal areas with considerable human impact (shaded areas: tourism, sand extraction, agriculture and other forms of development).

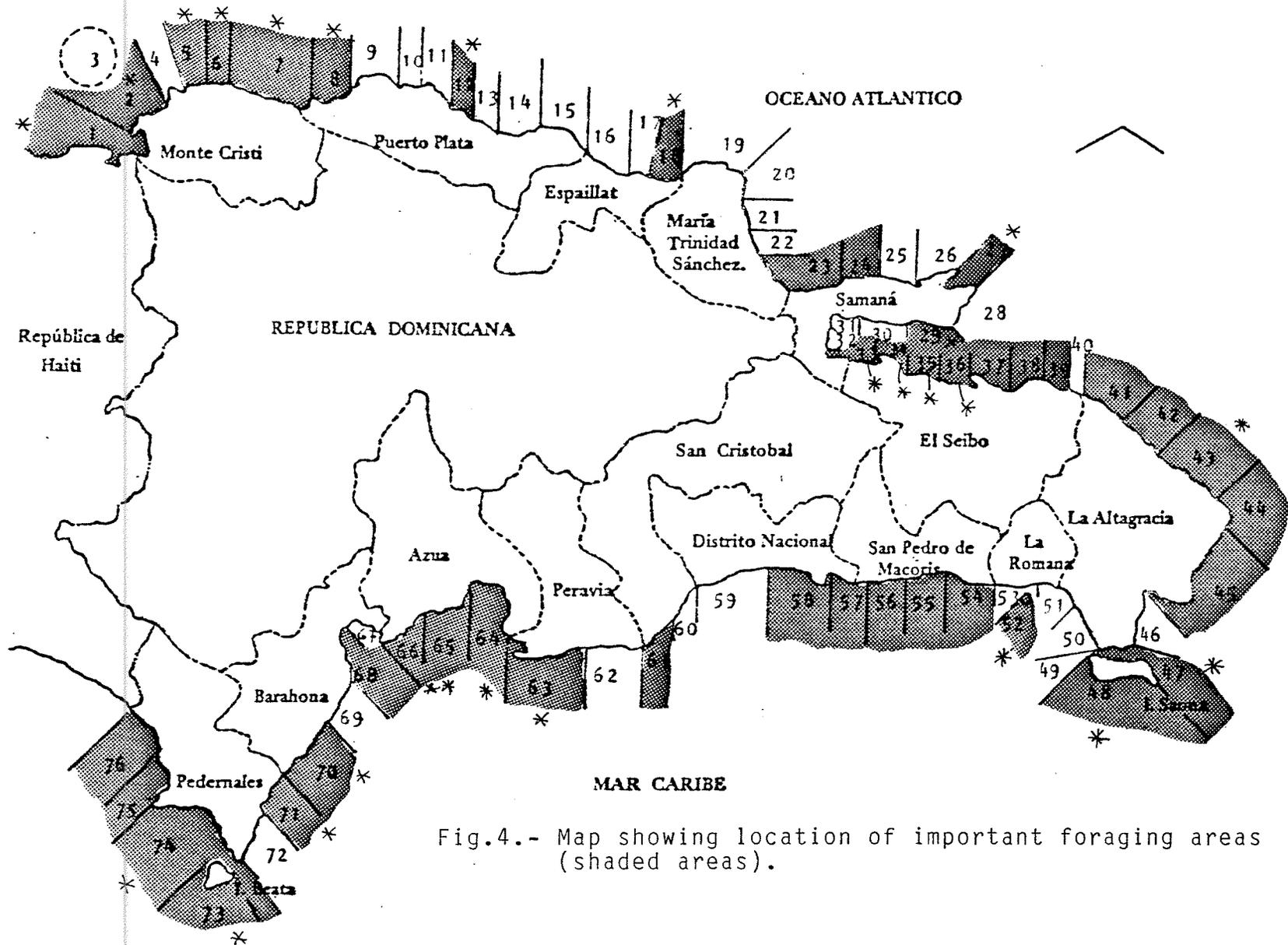


Fig.4.- Map showing location of important foraging areas (shaded areas).