A Contribution to the History of Marine Turtles Exploitation in Venezuela

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ABSTRACT

The marine turtle populations in Venezuela have been systematically declining since the 16th century, following the trend otherwise reported for other areas in the Caribbean. Turtle remains recovered in the pre-Hispanic archaeological sites are not as abundant as it might have been expected, even areas of recognised natural abundance of these animals such as the offshore islands. The reason of this scarcity is not clear and can be attributed to the recovery or preservation bias and/or to the operation of ancient taboos among other possible explanations. The ethnohistoric and other documentary sources testify that turtles were systematically exploited for eggs, meat, oil and carapace in all areas of their natural distribution, during the colonial (16th – 18th century) and republican (19th century) times. The nesting beaches located on the offshore islands (Isla de Aves, Los Roques Archipelago and Margarita Island), and on the eastern continental coast, were especially targeted. The 20th century brought the unprecedented intensification of the fishery and loss of natural habitats, principally the nesting beaches. Today, despite the ban imposed on turtle fishery and the conservation efforts coordinated by both governmental and non-governmental agencies, there are no signs of recovery of turtle populations in the country.

KEY WORDS: Turtle fishery, zooarchaeology, Venezuelan islands.

Una Contribución a la Historia de la Explotación de la Tortugas Marinas en Venezuela

Las poblaciones marinas de la tortuga en Venezuela han estado declinando sistemáticamente desde el decimosexto siglo, siguiendo la tendencia divulgada de otra manera para otras áreas en el Caribe. El restos de la tortuga recuperado en los sitios arqueológicos el pre-Hispánico no es tan abundante como puede ser que haya esperado, uniforme en las islas costa afuera, las áreas de la abundancia natural reconocida de estas especias. La razón de este subrepresentation no está clara y se puede atribuir al diagonal de la recuperación o de la preservación y/o a la operación de tabúes antiguos entre otras explicaciones posibles. Fuentes ethnohistoric y las otras documentales atestiguan que las tortugas fueron explotadas sistemáticamente para los huevos, la carne, el aceite y el carapacho en todas las áreas de su distribución natural, durante los tiempos coloniales (decimosexto - décimo octavo siglo) y republicanos (del diecinueveavo siglo). Las playas del nesting situadas en las islas costa afuera (Isla de Aves, archipiélago de Los Roques e isla de Margarita), y en la costa continental del este, fueron apuntadas especialmente. El vigésimo siglo trajo la intensificación sin precedente de la industria pesquera y la pérdida de hábitat naturales, principalmente las playas del nesting. Hoy, a pesar de la interdicción impuso ante industria pesquera de la tortuga y los esfuerzos de la conservación coordinados por las agencias gubernamentales y no gubernamentales, allí no son ninguna muestra de la recuperación de las poblaciones de la tortuga en el país.

PALABRAS CLAVES: Islas de Venezuela, Pesquería de Tortugas, zooarcheologia.

INTRODUCTION

Sea turtles in Venezuela

Five out of seven species of the world's marine turtle are found in Venezuelan waters (Hendrickson 1980: 600). Four of them nest at their islands and continental beaches (Guada and Sole, 2000). The green turtle (*Chelonia mydas*), that reproduces in almost all Venezuelan islands and some continental beaches, is most valued for food (Buitrago 1987a). The Isla de Aves nesting colony is the second major breeding ground remaining nowadays in the Caribbean. Its preferred feeding habitats are sea grass and algae beds (Rebel 1974: 46; Pritchard 1967).

The hawksbill turtle (*Eretmochelys imbricata*) also reproduces on the Venezuelan coasts and islands; its largest nesting colonies have been reported from Los Roques Archipelago (Buitrago 1980; 1987) and Paria Peninsula (Guada 2000; Buitrago and Guada, 2002) and their feeding grounds are coral reefs and other hard bottom areas. The translucent plaques of the carapace of this turtle, the tortoiseshell, have traditionally been used to produce diverse decorative artifacts and utensils. The loggerhead (*Caretta caretta*) that feeds on crabs, shrimps and mollusks, used to be the most common species in eastern Venezuela (Guada and Buitrago, in press) and is the third species of turtle whose nesting has been reported from Los Roques Archi-

pelago (Buitrago 1987).

The Olive ridley turtle (*Lepidochelys olivacea*) do not have known reproductive sites in Venezuela. It is relatively common in eastern Venezuela feeding grounds, but very rarely visits the Los Roques and other off shore islands (Buitrago 1987; Guada and Vernet 1992). The leatherback turtle (*Dermochelys coriacea*) has pelagic habits and is relatively scarce in Venezuelan coastal waters except during the reproductive season. It mains nesting areas are in eastern Venezuela; Paria peninsula and Margarita Island. Occasionally nests in Los Roques Archipelago, La Blanquilla and other off shore islands. The flesh of this species is rarely eaten; however, from both the flesh and soft carapace is extracted the oil (the oil of the luth) that has traditionally been used for medicinal purposes and for waterproofing boats (Rebel 1974). This is the largest species and may reach a weight of more than 600 kg.

The pre-Hispanic record

As in the majority of prehistoric sites in the Caribbean (Wing and Reitz 1982; Newson and Wing 2004), the remains of marine turtle are also among the most numerous vertebrate remains on Venezuelan coasts and off-shore islands. Among the island sites, special attention has been paid to the recovery and analysis of turtle remains on the Dos Mosquises Island, in the Los Roques Archipelago (ca. A.D. 1200-1500) (Antczak 1999; Antczak and Antczak 2007). Here, a total of 949 turtle remains were recovered and 843 (89%) skeletal elements identified (Table 1). Over 77% (N=654) of identified elements are upper shell (carapace) fragments. Almost all parts of the turtle skeleton are represented, although in uneven quantities, indicating the operation of cultural and/or natural processes. The deposition of the majority of head remains on the beach may indicate that the animals were butchered on the seashore. On the other hand, the presence of some head remains within the site indicates that not all turtle heads were cut-off and discarded off-site, as may be suggested by ethnographic data and evidence from other sites in the Caribbean (Hamblin 1984).

How the archaeological evidence correlates with early ethnohistorical data?. Pimentel noted that "the aborigines [from the central coast] go there [to Los Roques, Las Aves and La Orchila islands] during the months of *bonanza* [fair weather] for salt and for the turtles to eat them and to extract oil from them" (Pimentel 1964[1578]).

Is this protohistoric turtle exploitation documented in the insular archaeological record? Can the archaeological island data match the expectations raised by the Pimentel's account? A total MNI of 22 turtles (counting the number of humerii divided by two) were captured by the occupants of Dos Mosquises Island site. Probably, other few dozens of turtles are concealed behind the remains recuperated on other Los Roques islands. This does not seem an impressive quantity when compared to more than 500 turtles which, despite the overexploitation and the prohibition imposed on fishing, are 'incidentally' captured in Los Roques Archipelago yearly (Guada and Vernet 1992). It was expected that 500 years ago a reduced group of fishermen could catch 22 turtles in few days time. If, according to Pimentel, the turtle was one of two most target resources that motivated the Amerindians to cross 135 km of open sea, then the relatively low quantity of turtle remains recovered on the islands does not match the expectations. How can we reconcile these issues?

Certainly, taphonomical and recovery biases could lower the number of turtle remains deposited originally in the archaeological sites. An unknown quantity of turtles might have been butchered on the island beach, the meat separated for drying and delayed consumption and bones discarded off-site and/or thrown into the sea. Another unknown quantity of live turtles might have been brought to the mainland. As a result, the exploitation of turtles may have been much more intense than is reflected by the excavated remains.

Turtle fisheries during pre-Hispanic and colonial times

At the beginning of the 16th century, Fernandez de Oviedo y Valdéz (1962 [1535]) described quite accurately the nesting of "many gigantic turtles, with as much meat as a six months calf" on Cubagua and other eastern islands of Venezuela, clearly referring to green turtles.

Both, the pre-Hispanic archaeological record and the early colonial documentary sources suggest that the nesting females were especially vulnerable targets. The Insular Caribs turned the nesting females upside down with the aid of a wooden stick (Lovén 1935; Alcedo 1988[1786-89]). Additionally, the majority of species arrive for nesting in groups, and in know and predictable seasons, so that many animals can be caught in one night. Once captured, the turtles may immediately be slaughtered or kept alive for delayed consumption or transportation and further redistribution. The Amerindians from Cuba used to keep as many as 500 to 1000 turtles in marine corrals (Las Casas in Lovén 1935). The terrestrial turtles from the mainland were also kept in corrals (Bellin 1986[1763]; Lovén 1935) and/or transported in canoes with tied limbs (Gumilla 1988 [1741]). In four weeks the captive animals could lose as much as 20% of their weight (Rebel 1974: 96), but they still represent fresh meat 'in hand'.

Harpoons were also used by the Insular Caribs to fish marine turtles (Lovén 1935: 425) and they were also used to pursue Orinoco turtles (Carvajal 1956[1647-48]). The *Achagua* of the River Orinoco used bows and arrows for this purpose (Rivero 1956[1733]). The early colonial sources did not leave data about the use of large nets to capture turtles by the Caribbean Amerindians (Wing and Reitz 1982), but pertinent information comes from Cayenne, French Guyana, where nets 4.8-6.4 m wide and 80-100 m long, with openings of 30 cm^2, were used especially to capture turtles (Bellin 1986[1763]). Columbus observed the Amerindians of Cuba fishing turtles with *remoras*

(sucker fish [Lovén 1935]). Finally, skilful swimmers could also catch turtles by hand (Alcedo 1988[1786-89]; Gumilla 1963[1745]). In 1988, we observed in Las Aves de Sotavento Archipelago, a group of fishermen who were shouting and pursuing a turtle with a boat toward the shallow water where it was captured by hand.

Until recently, the fishermen from Los Roques Archipelago were using gill and trammel nets and, occasionally, harpoons for turtle fishing. To attract turtles to the net, especially during full moon nights, some of the gill nets had decoys; roughly shaped turtle-like sculptures made out of wood attached to the extremities of the upper line (information from Teobaldo Salazar, 1983).

The volume of meat obtained from marine turtle is relatively large. The green turtle may weigh as much as 275 kg and its flesh constitutes about 40% of its total weight (Rebel 1974). The meat of one green turtle of 86-95 kg may weigh 40.8-45 kg (Nietschmann 1972).

Modern techniques of preserving turtle meat do not differ greatly from the ancient ones. The contemporary Los Roques fishermen separate turtle flesh from bones, cut it into thin strips, salt and sun-dry, for delayed consumption. Dry turtle meat may be kept for more than two months (information obtained from fishermen José Ana Marval, Luis Marcano, Teobaldo Salazar, 1983-1985). When the meat is prepared for immediate consumption, the only parts that are discarded are the head, long bones (those which cannot fit in the cooking vessel), the upper carapace and certain intestines. The turtle's head is cut off, often while still on the boat, and discarded in the sea. The turtle's bite is considered dangerous, and painful, and large turtles are able to damage the edges of the boats with their hard, strong beaks (information obtained from Teobaldo Salazar, 1983). All other parts of a turtle's carcass, including the fat, are put into a large metal pot (*paila*), cooked with herbs and salt, and consumed for several days. Alternatively, a part of the fat may be boiled separately and converted into oil. All parts of *Dermochelys coriacea*, whose flesh often is not eaten, are put in a large pot and cooked for oil, except for the head (information obtained from fisherman Teobaldo Salazar, 1983). At present, the fishermen use the oil for medicinal and cosmetic purposes, and eating the meat is

TABLE 1. Marine turtle remains (Chelonidae) from different trenches of excavation at Dos Mosquises Island site, A.D. 1200-1500 (taken from Antczak 1999). *

Skeletal element	Trench A 0-20	Trench B 20-40	Trench C 20-40	Trench D 20-40	Trench E 20-40	Trench F 0-20	Total NISP
Carapace (fragment)	147	189	192	29	48	49	654
Vertebrae	36	22	1	0	6	2	67
Humerus	28	10	6	0	1	0	45
Phalanx (fragment)	15	4	0	0	0	0	19
Femur	12	2	2	0	2	1	19
Scapula	3	2	2	0	0	0	7
Cranial (fragment)	6	0	0	0	0	0	6
Coracoid	3	2	1	0	0	0	6
Fibula	3	2	1	0	0	0	6
Ulna	4	1	0	0	0	0	5
Mandibular fragment	2	0	1	0	0	0	3
Tibia	1	2	0	0	0	0	3
Isquion	1	0	1	0	0	0	2
Pubis	1	0	0	0	0	0	1
Subtotal	233	236	207	29	57	52	843
Long bone UID (fragment)	14	9	1	2	5	2	33
Tarsal carpal or phalanx (fragment)	3	2	0	3	2	3	13
UID	17	10	15	0	12	6	60
Subtotal	34	21	16	5	19	11	106
Total	267	257	223	33	77	63	949

* Skeletal element identification by Alfredo Paolillo O. Fundación Venezolana para la Conservación de la Biodiversidad Biológica BIOMA, Caracas. UID - unidentified skeletal element.

an increasing behavior. Regarding the specific Amerindian methods of turtle preparation for consumption Alcedo (1988[1786-89]) mentioned that the meat was left all night with lemon juice and thereafter roasted directly over a fire or coals in the carapace.

The upper turtle carapaces were often used as receptacles to deposit the mass of grated bitter manioc, as musical instruments used in ceremonies, and as seats by the Sáliva Indians of the Venezuelan Llanos (Morey and Morey, 1980). Carapaces were also mentioned among kitchen utensils of the *Achagua* Indians (Arellano, 1986). The social significance of the multiethnic Amerindian congregations involved in the capture of the Orinoco River *terecay* (*Podocnemis unifilis*) and especially *arrau* (*Podocnemis expansa*) turtles, and the economic value of the oil extracted from their eggs, were extensively described by missionaries and early visitors to that region (Gumilla 1988 [1741]; Bueno, 1965[1788-1801]; Humboldt 1956[1814-1825],; Chaffanjon 1986[1889]; Morey and Morey 1980). Gumilla (1988[1741]) observed that the oil was used to 'rub the body twice a day all through the year and to sell it to the remote [Indian] groups'. According to Humboldt, the oil was mixed with red pigment (*onoto* [*Bixa orellana*]) and used in body painting (Humboldt 1956[1814-1825]). Joseph de Cisneros (1988[1764]) related that the oil was used to make a kind of butter (*manteca*) that was traded to Indian groups located farther from the Orinoco, who 'rub [with it the] body in summer [dry season], mixing it with coloured dye called *barquiz* which is very fresh and resists the sun'. According to Lovén (1935) the Island Caribs used body painting as protection against salt water and insects (see also Civrieux 1980). Turtle oil was also used for cooking and to fuel lamps (Caulín 1966[1779]; Morey and Morey 1980).

Turtle eggs have been appreciated all over the Caribbean (Rebel 1974). The nests are easily located by following tracks left on the sand by the female. The eggs are eaten boiled or preserved by the contemporary Venezuelan fishermen (Antczak 1999). After a capture of a female turtle on the beach, some eggs found in its interior are with shell, others, without shell, are contained inside the tripe (*in bala*). These unshelled eggs are carefully extracted and put in a pot with salted water (*salmuera*), for 2-3 hours. Meanwhile the tripe is washed and cleaned. Thereafter the eggs are put back inside the tripe whose extremities are tied up and the whole thing is hung in moderate sunlight for 5-7 days. Such *morcilla* may be consumed several months later (Antczak 1999). Gumilla (1988[1741]) described a somewhat similar process, by which the Orinoco Indians used to dry terrestrial turtle eggs for delayed consumption.

According to Carr (1973), the nutritive value of both turtle flesh and eggs contributed to their reputation as an aphrodisiac all over the Caribbean. However, the eggs rather than the meat are considered an aphrodisiac by the Venezuelan fishermen. Today they search frenetically for turtle eggs on many coastal and island beaches during the nesting season, dedicating to this activity an admirable quantity of time and energy.

In addition to the widespread use of meat, eggs and carapace, the turtles played an important role in the ceremonial life of pre-Hispanic people. In Venezuela, these data come from the inland located Lake Valencia Basin. Two ceramic turtle effigies recovered in this region are shown in Requena's book (1932). One ceramic figurine standing on a canoe shows a head-dress whose shape and decoration clearly resemble a turtle carapace (Vellard 1938). Kidder (1944) found a 'very realistic [turtle pendant], carved out of a thick piece of shell, probably *Strombus*', in a Valencioid deposit at La Cabrera. The iconic representation (turtle) and the raw material (*Strombus* shell) used to depict it combine symbolically these two target resources pursued by the Amerindians on the Vene-

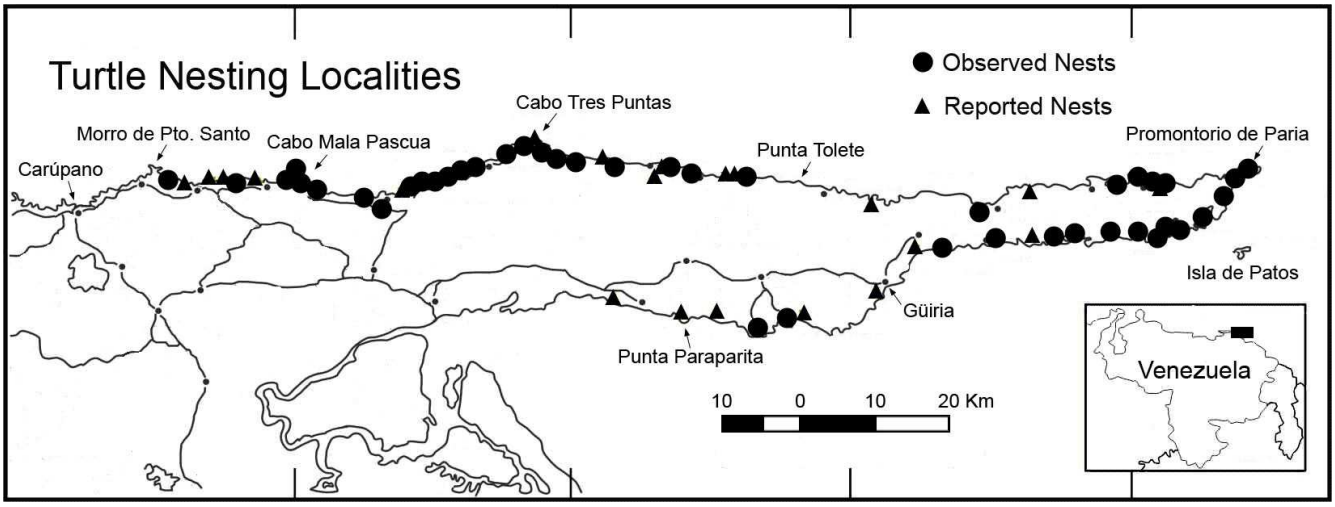

Figure 1. Nesting areas of the sea turtles along the Paria Peninsula, northeastern Venezuela (from Guada, 2004).

zuelan coasts and islands. We will argue that the turtle, like any other animal, has been perceived by humans as more than a conglomerate of economically desirable constituents. They may also have been the depositories of symbolic meanings. They are creatures that inhabit the sea but, unlike many other marine animals, they may also be found on land. On land almost exclusively females are encountered. Replete with eggs these individuals emerge from the sea, where they were made pregnant, to give a new life on the land. The female turtle may be considered as a distinctive mediator between the maritime realm in which the life is engendered and the terrestrial environment where it comes to life.

During the late colonial times references to sea turtles are scarce. Most documents are concentrated on multiple indictments of the illegal practice of giving liquor (*aguardiente*) to the Indians in exchange for cocoa beans and sea turtle meat. This procedure was especially common in Paria region during the late 18th century and legal action against accused traders were frequent in Carupano and Unare, indicating that both turtles and turtle fisheries were common in the region at that time. The price specified for a turtle in 1783 (Archivo General de Indias, Sevilla, 1783) was 3 silver *pesos* or exchange for a knife, a machete, an axe plus a liquor bottle. It is noteworthy that in this same time and place a horse was valued at 4 *pesos* what emphasizes the high value of the turtles. By 1803, Depons (1930) mentioned that five fishermen from Margarita Island were intensely dedicated to the "fisheries of many turtles". This suggests that a relatively small number of fishermen specialized in turtle fishery could significantly alter the local stocks.

Oldest available statistics on the capture of hawksbill turtles are based on the listings of commerce and exportation of the tortoiseshell. The earliest report mentions 15 pounds of tortoiseshell exported from La Guaira in August 25 1827 (Méndez, 1963). Further similar reports made reference to specific shipments of tortoiseshell; however, they are sporadic and did not mention consolidated quantities pointing out the persistence of that commerce.

Turtle exploitation during the 20th century

The exportation from Venezuela of over ten thousand kilograms of tortoiseshell during the first years of the 20th century indicates a relatively intense capture of hawksbill turtles by that time. An adult hawksbill yields about a kilogram of tortoiseshell, so the export data indicates the killing of thousands of hawksbills per year.

In 1952, fisheries data indicated over 10 tons of unspecified turtle species landings mainly from Margarita Island (República de Venezuela, 1953). Between 1965 and 1966 the landings increased to 32 and 38 tons respectively, being more than half of them reported from Margarita Island (República de Venezuela, 1965; 1966). Venezuelan tortoiseshell exports, included in commodities exports, but not in fisheries statistics, varied from 453 kg in 1957 to 2,447 kg in 1959 (Groombridge and Luxmoore, 1989). Sea turtles captures at Los Roques Archipelago varied between a relatively low quantity of 3,780 kg in 1962 to a high figure of 55,975 kg in 1968 (Rebel, 1974). These landings reached some 56 ton between 1968 an 1973 (Buitrago, 1980). Official landings reports, even after wildlife law approval in 1970 (Babarro, 2004), continued for some years, accounting for 25 tons in 1971; 36 tons in 1972; 27 tons in 1973; 4 tons in 1974, and diminished to 70 kg in 1975 and 100 kg in 1976 (República de Venezuela, 1975 - 1979).

The green turtles nesting grounds on Isla de Aves have long been exploited by fishermen from different Caribbean islands. Parsons (1962) reported that by 1960, two sailing vessels from St. Lucia used to take 50-60 turtles a trip from the Aves Island to Dominica, making about six trips per season. The total number of green turtles passing along this route was estimated at 400 per year.

Although since the nineties there are much more people working in the field in the nesting areas, turtle uses are better reported and some people is making in-water research, comprehensive data must be prepared about how many turtles have been killed to satisfy the subsistence use and illegal commerce in the country and going to other countries as Colombia, Aruba, Curaçao and Bonaire (Brautigam and Eckert, 2006; de los Llanos, 2002; Guada and Solé, 2000), among others.

One of the areas with best knowledge of its nesting sites (Figure 1) and the different natural and anthropogenic impacts on sea turtles, is the Paria Peninsula. In this region, a group of researchers is present during at least 6 months of the year during the nesting season since 1999. This continuous monitoring has permitted to obtain information about the nesting females on the northern beaches of the peninsula. During 2005 and 2006, we may infer the killing of at least 30 nesting females annually, mainly of the leatherback turtle, *Dermochelys coriacea*, in this geographic area, without considering the incidental caught in the fisheries. In the artisanal fisheries, the turtles brought onboard usually are not returned to the water and the drowned ones, typically are butchered. Considering the live turtles in the nets and the drowned ones, the numbers surpass several hundreds each year (Guada, 2000).

The situation described for Paria Peninsula is common to other coastal areas of Venezuela. For example, Montiel-Villalobos et al. (2006) inferred the killing of over 600 turtles in the Gulf of Venezuela. The numbers of incidental and intentional caught of turtles in the western state of Falcón, seem to be similar to those recorded in the Gulf of Venezuela. In the intentional caught of sea turtles in the westernmost region of the country an important part are playing the indigenous *Wayúu* or *Guajiro*s, who occupy the Guajira Peninsula shared by Colombia and Venezuela. As in other places where indigenous people are involved in the intentional caught (for example, the *Miskito* green turtle fishery in Nicaragua referred by Chacon, 2001), the tradi-

tional sociocultural context of the sea turtle use should be taken into consideration.

Incidental captures

The incidental captures in both artisanal and shrimp trawlers continue to be the main mortality factor for the Venezuelan turtles. During over five years (the early 1980) of analysis of small scale fishery landings on the northern coast of Margarita Island, an average of 446 turtles captured per year was reported (Buitrago 1987). In 1992, the illegal take of marine turtles (*Chelonia mydas* and *Eretmochelys imbricata* primarily) by artisanal fishers in Los Roques National Park was estimated at ca. 500 animals per year (Guada and Sole, 2000). During 1998 and 1999, Parra (2002) reported the capture of 244 turtles, primarily greens (71%), but also a significant number of hawksbills (12%) in the Guajira region. During the same time, an estimate of 490 turtles were captured incidentally per year on the northern shore of the Paria Peninsula, on the eastern coast of Venezuela, while 1,056 turtles were taken on the southern coast of the same peninsula.

Table 2. Nesting estimates of marine turtles in Venezuela (the 20th century mainly).

Species and Localities		Nesting Abundance Estimates (N= nests F= Females)		References
Eretmochelys imbricata				
Paria	Past estimates	33 (N)	1997	Guada, 2000; Buitrago and Guada, 2001
		65 (N)	1998	
	Recent estimates	40 (N)	2003	Quijada and Balladares, 2004
		45 (N)	2004	
Los Roques Archipelago	Past estimates	61 (N)	1979	Buitrago 1987; Buitrago and Guada, 2001
	Recent estimates	32 (N)	1998	Guada, 2000; Mata et al. 2002;
		104 (N)	2001	de los Llanos, 2002
Miranda (El Banquito and adjacent beaches)	Recent estimates	7 (N)	2000	Provita, 2004
		2(N)	2001	
		25 (N)	2002	
		8 (N)	2003	
Caretta caretta				
Miranda (El Banquito and adjacent beaches)	Past estimates	15 - 20 (N)	1999	Provita, 2004
	Recent estimates	7 - 10 (N)	2001	Provita, 2004
		2 (N)	2003	Provita, 2004
Paria Peninsula	Past estimates	> 200 F nesting season	1940/ 1950	Guada, 2000, Guada and Buitrago, in press.
	Recent estimates	Scarce < 20 F nesting season	2006	
Chelonia mydas				
Aves Island	Past estimates	150 - 200 F weekly	1947	Pinchon, 1967
		1050 F	1947	Seminoff, 2004
		30 - 50 F weekly	1973	Rainey 1977
		>100 F per month	1973	Ralston, 1974
		593 F	1979	Peñaloza, 2000
	Recent estimates	337 F	1997	Peñaloza, 2000
		344-1439 F	2000	Peñaloza, 2000
		300 - 500 F	2006	Guada and Buitrago, in press.
		500 - 700 F	2004	Vera, 2004
Cubagua Island	Past estimates	Many and big F	1514	Fernandez de Oviedo, 1992
	Recent estimates	None	1980 - 2007	Medina et al., 1987

Table 2. continued

Dermochelys coriacea				
Paria Peninsula, Cipara Beach	Yearly estimates	37 F	2000	Mendoza et al., 2005
		51 F	2001	
		30 F	2002	
		43 F	2003	
		38 F	2004	
Paria Peninsula, Cipara Beach	Yearly estimates	102 N	2000	Rondon, 2006
		190 N	2001	
		176 N	2002	
		193 N	2003	
		216 N	2004	
		179 N	2005	
Paria Peninsula, Querepare Beach	Yearly estimates	32 F	2000	Guada and Buitrago, 2001
		19 F	2002	Mendoza et al., 2005
		31 F	2003	Mendoza et al., 2005
		37 F	2004	Mendoza et al., 2005
Paria Peninsula and Margarita Island	Past estimates	149 N	2000	Guada, 2001
	Recent estimates	200 - 300 F	2006	Guada and Buitrago, in press.
Miranda (El Banquito and adjacent beaches)	Yearly estimates	11 N	2000	Provita, 2004
		27 N	2001	
		25 N	2002	
		26 N	2003	

Shrimp trawling fisheries incidental captures in Venezuela was estimated in one individual each 732 trawling hours or 1370 turtles per year (Marcano and Alió, 1992). The estimation based on the effort needed to capture the reported shrimp landings (Altuve et al. 1999) yielded the figure of 2,173 turtles captured incidentally in 2000 (Buitrago and Guada, 2002).

CONCLUSIONS AND RECOMMENDATIONS

Despite important governmental and private efforts the areas of nesting beaches are constantly diminishing and the overall anthropogenic pressure on both nesting beaches and feeding grounds is growing. Pritchard and Trebbau (1984) pointed out that many areas along the continental coast, where nesting beaches have once been important, have disappeared completely, having been replaced by urban centers. Although there is neither enough data to make robust inferences on populations trends, data shows that in those nesting areas that are the object of protection, research, and conservation projects, the killing of females and nest poaching have been almost suppressed, and adult females number may be stable; however, in the vicinities of these areas, these activities continue uncontrolled. The quantities of furtive and incidental landings are alarming especially taking into account that the numbers presented in this paper are underestimates. Given that several coastal regions are still poorly surveyed the annual incidental and furtive killing may involve several thousand of turtles. In consequence, the current status of marine turtle in Venezuela is not satisfactory and thus, the future of the resource is not very optimistic.

To stop and/or reverse the negative trends and improve marine turtle protection in Venezuela several recommendations that derive from long-time research may be outlined. Some of them coincide with those proposed by Brautigam and Eckert (2006), and express concerns that are common to wide Caribbean macroregion. In Venezuela, a comprehensive survey and further assessment of marine turtle catch is needed urgently. It is also necessary to establish a systematic monitoring program, including national and regional networks of Index Monitoring Sites (including foraging and nesting sites), in order to document population size and trend *in situ*. At the same time it is important to elaborate and implement an outreach strategy that would increase awareness in the different sectors of the society, including local fishermen and coastal communities, as well as tourism operators and visitors. Finally, we would prompt the development and implementation of a compliance strategy, including periodic patrols of landing sites, markets and other points of sale, between several proactive approaches toward law enforcement.

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Table 3. Quantification of marine turtle fishery in different regions of Venezuela between 1960 and 2002.

Locality/region	Species	Quantity/volume	Period	Reference
Aves Island	*Chelonia mydas*	400 individuals/year	1960	Parsons, 1962
La Blanquilla Island	*Chelonia mydas*	6 individuals/year	1985-86	Medina et al. 1987
La Blanquilla Island	*Eretmochelys imbricata*	2 individuals/year	1985-86	Medina et al. 1987
Margarita Island	*Chelonia mydas*	370 individuals/year	1981-1986	Buitrago, 1987; Medina et al. 1987
Margarita Island	*Eretmochelys imbricata*	66 individuals/year	1981-1986	Buitrago, 1987; Medina et al. 1987
Margarita Island	*Caretta caretta*	5 individuals/year	1981-1986	Buitrago, 1987; Medina et al. 1987
Margarita Island	*Lepidochelys olivacea*	5 individuals/year	1981-1986	Buitrago, 1987; Medina et al. 1987
Los Roques Archipelago	Turtles	3.8 tons/year	1962	Rebel, 1974
Los Roques Archipelago	Turtles	56 tons/year	1968	Rebel, 1974
Los Roques Archipelago	Turtles	56 tons/year	1968-1973	Buitrago, 1980
Los Roques Archipelago	Turtles	500 individuals/year	1992	Guada and Solé, 2000
Gulf of Venezuela	*Chelonia mydas*	92 individuals/year	1986	Medina et al. 1987
Gulf of Venezuela	*Eretmochelys imbricata*	3 individuals/year	1986	Medina et al. 1987
Gulf of Venezuela	*Caretta caretta*	1 individuals/year	1986	Medina et al. 1987
Gulf of Venezuela	Turtles	>200 individuals/year	1998-2000	Parra, 2002
Gulf of Venezuela	Turtles	> 600 individuals/year	2000-2005	Montiel-Villalobos et al. 2006
North Paria Peninsula	Turtles	490 individuals/year	1997-1998	Guada, 2000
South Paria Peninsula	Turtles	1050 individuals/year	1997-1998	Guada, 2000
Venezuela	Turtles	32 tons/year	1965	República de Venezuela, 1965
Venezuela	Turtles	38 tons/year	1966	República de Venezuela, 1966
Venezuela	Turtles	25 tons/year	1971	República de Venezuela, 1975
Venezuela	Turtles	36 tons/year	1972	República de Venezuela, 1975
Venezuela	Turtles	27 tons/year	1973	República de Venezuela, 1975
Venezuela	Turtles	4 tons/year	1974	República de Venezuela, 1975
Venezuela	Turtles	70 kilograms/year	1975	República de Venezuela, 1979
Venezuela	Turtles	100 kilograms/year	1976	República de Venezuela, 1979
Trawling fisheries	Turtles	1370 individuals/year	1992	Marcano and Alió, 1992
Trawling fisheries	Turtles	2173 individuals/year	2002	Buitrago and Guada, 2002
Venezuela	Tortoiseshell	2447 kilograms/year	1959	Groombridge and Luxmoore, 1989