RESEARCH REPORT FOR 2002

MONA AND MONITO ISLAND
HAWKSBILL TURTLE RESEARCH PROJECT

INTRODUCTION

The following report documents our research findings for the 2002 field season at Mona and Monito Islands. This work is a continuation of the research conducted by us since 1992, focusing on the population dynamics and ecology of hawksbill turtles (Eretmochelys imbricata). The assembly of hawksbill turtles at these islands is unique for its accessibility for research, and turtles are found there in relatively high abundance. By applying and optimizing a variety of methods for capture, sampling and tagging of turtles previously described; we have collected a substantial amount of information on the characteristics and behavior of hawksbill turtles. In addition to the in-water studies, we provide summary results on the turtle nesting activity observed on the beaches of Mona Island. Also, in the appendix we included a list of turtles captured during this season, a report on a sex ratio study for hatchlings, a bibliography related to results of this project, and our most recent publication (in press). The information presented in this report together with other information is being process for peer-review publications.

Study area

Situated in the middle of the Mona Passage between the islands of Hispaniola and Puerto Rico, Mona (18°05'N, 67°54'W) and Monito Islands are uninhabited natural reserves managed by the Puerto Rico Departamento de Recursos Naturales y Ambientales. Mona and Monito Islands are reserves managed by the Puerto Rico Department of Natural and Environmental Resources. Sea turtles have been formally protected there since the introduction of the Endangered Species Act of 1973. In 1982 the U.S. Fish and Wildlife Service declared the beaches of Mona Island Critical Nesting Habitat for hawksbill turtles. On September 2, 1998, the "waters extending seaward 3 nm from the mean high water line" of Mona and Monito Island were declared Critical Habitat for hawksbill turtles.

IN-WATER SURVEY - *METHODS AND RESULTS*

Turtle capture

Fieldwork during 2002 was conducted from July 15 to September 15, with additional short visits to Mona for censuses and other miscellaneous purposes throughout the year. Our methods are the same as described in detail past reports.

The effort involved with sighting and capturing of turtles at our main study areas (the Carabinero-Mujeres and Sardinera-Carmelitas coral reefs and the cliff walls of El Norte and Monito Island) were assessed by measuring the time spent for each survey session. With one survey hour defined as a unit of effort, the overall catch per unit effort (CPUE) during 2002 was 7.39 hawksbills/hour (captures + sightings), with on average 3.0 persons in the water. Table 1 gives a breakdown of CPUE's by survey sites for 2002. The cliff wall habitats of Mona -and especially Monito- continues to have an exceptionally high densities of hawkbill turtles. The overall CPUE indicates a significant increase from last year (2001: 5.83 hawksbills/hour). Figure 1 depicts the CPUE with standard error bars for our three main study sites. Population trends varied according to site when pooled data from other years. Not all the turtles captured were recorded in the CPUE because of the different methodology applied.

Table 1. Catch per unit of effort (CPUE) during 2002 for each of the survey sites in the study area.

Survey sites	Hours	Captures + sightings per hour
Mona: Carabinero-Mujeres (reef)	**24.05**	**3.84**
Mona: Sardinera-Carmelitas (reef)	**9.75**	**2.20**
Mona: El Norte (cliff wall)	**13.83**	**7.34**
Mona: other areas (reef)	**1.66**	**5.77**
Monito (cliff wall)	**11.60**	**17.81**

During our month-long presence on Mona during 2002, we captured a total of 168 hawksbill including 4 green turtles. This captures turtles were caught primarily along the northwest half of Mona Island and around all of Monito Island. Hawksbill turtles ranged in size from 20.9 to 88.7 cm notch-tip straight carapace length (N-T SCL), green turtles ranged from 23.3.4 to 40.2 cm N-T SCL. Figure 2 illustrates the size distribution for hawksbills caught during this season. Notice animals from all size classes are represented. Eighty-nine hawksbills were captured bearing tags applied in previous years (see figure 3). Untagged hawksbill turtles measuring less than 30 cm SCL size class are considered new arrivals to the study area and in 2002 we found 31 such recruits. Further analisys is underway to determine the rate of increase of recruits for the pasts seasons. Eventhough,, this season's numbers are the highest ever observed.

Blood sampling

Blood and/or tissue samples were collected from 20 adult males, 8 adult females, 31 recruitment size hawksbills, and 4 green turtles. Analysis of these materials through genetic profiling may allow us to assign the source population in the case of immature turtles, and for the adults further characterize the Mona Island breeding population. Sample processing will be conducted by Dr Owen McMillan of the Department of Biology, University of Puerto Rico.

Instrumentation

Satellite transmiters were deployed on four breeding male hawksbills on the first week of September (see pasts reports for methods). Figure 4 illustrates the position were these animals where last located. Two of them are still in Mona Island waters (same place as captured), while the other two are in the west and south coast of Puerto Rico (which is not very far from Mona Island.

In addition, time-depth recorders with orientation devices were deployed on 10 juvenile hawksbills for foraging behavior studies. This research was conducted with the colaboration of Sandra Storch, University of Kiel, Germany.

Nesting Surveys

Surveys of the Mona nesting beaches were conducted weekly from July to December 2002, and at irregular intervals the rest of the year. Surveys consisted of counting the number of fresh turtle tracks, determining whether a nest was deposited or not ("false crawls"), and assessments of reproductive success by digging up hatched nests.

For the survey period from July 15 to 5 December 2002, we found a total of 847 hawksbill nests and 1116 false crawls. The 2002 hawksbill nesting season is considered a record year, with an increase of almost 65% more than last season. Figure 4 shows an continued rise in the hawksbill nesting activity detected since 1994.

A subset of 163 nests were examined after hatching and yielded the following nest productivity parameters. The average nest hatching success, lower limit was 69.78% (assuming live hatchlings encountered would have perished). The upper limit hatchling success was 75.46% (assuming all live hatchlings would have eventually emerged). Mean clutch size was 148 eggs. No nest predation by pigs was observed. The 847 nests production at Mona Island was estimated to ranged between 87,473 and 94, 594 hatchlings. Although, the hatchling success was lower than other years; the hatchlings produced during this season was the larger ever reported for Mona Island.

Mona Island is considered as one of the most important hawksbill nesting grounds in the Caribbean Region with more than 600 nests per season during the past years (Meylan, 1999) and this season over 847 nests. We attributed this increases to the conservation factor. Federal and State laws have protected marine turtles in Puerto Rico since 1973. Also the implementation of CITES to control the international trade have probably contributed to this increase. Although illegal take continues and poaching of eggs too, the levels of take are much less than 1970's and 1980's. Data on satellite telemetry (Van Dam and Diez, pers obs.) together with DNA studies (Bowen et al 1996; Diaz-Fernandez et al, 1999) suggests that hawksbills from Mona Island migrate to other locations in the Caribbean Region. Therefore, commercial or sustainable fishing in other geopolitical areas may have an impact in the hawksbills nesting at Mona Island. The recent reduction on the legal Cuban harvest of 5,000 animals to 500 animals by the year 1994 may be linked to the increase in Mona Island nesting numbers (Carrillo et al, 1999). However, it

seems that the already in existence continuous take of 500 individuals would not have a major impact on the Mona Island nesting population . Hence, we are still expecting more increases on nests numbers, since nests have been protected from predation of feral pigs since 1989.