RESEARCH REPORT FOR 2001

MONA AND MONITO ISLAND
HAWKSBILL TURTLE RESEARCH PROJECT

PREPARED BY

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INTRODUCTION

This report documents our research findings for the 2001 study season at Mona and Monito Islands, and includes notes on turtle nesting activity through January 2002. 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 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 data on the turtle nesting activity observed on the beaches of Mona Island.

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. Both islands are uplifted plateaus consisting of carbonate rock of marine origin dating from the Miocene-Pliocene. Mona Island, with a surface area of 55 km^2, features a low-lying, sandy coastal plain along most of its southwestern half; the northeastern coast and that of Monito is dominated by high vertical cliffs standing in 20-40m of water. A wide range of sublittoral bottom types is found along the topographically contrasting shores and, together with microclimate variation, gives rise to a great diversity of benthic communities. Sponge dominated communities are found along the cliff walls, sea caves,

and drop-offs. Communities dominated by hard and soft corals occur in all shallow (<30 m depth) and non-vertical hard bottom types along the southern half of Mona Island.

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 2001 was conducted from July 4 to August 4, with additional short visits to Mona for nesting censuses and miscellaneous purposes throughout the year.

Turtles were captured by hand in open water by snorkeling (skindiving) or with SCUBA. The 17-foot whaler "TAIMAI" fitted with a new 60 horsepower outboard motor was used for most in-the-water activities and made for a reliable research vessel.

Surveys for turtles were made along the coasts of Mona and Monito Islands, with the exception of Mona's northeast cliff coast, which was not visited. The methods used for these surveys consisted of snorkeling where water depth is less than 15 meters (50 feet), and a combination of snorkeling and diving with SCUBA or just diving with SCUBA, along the cliff coasts of Mona and Monito. Such surveys were made almost daily depending on weather and sea conditions. Sea conditions are good when water is clear and wind, waves or currents are minor.

The shallow water snorkeling surveys usually involved four people: three in the water and one person steering the boat. Those in the water swam in a certain direction, sep
Along the cliff coast, where the vertical cliff wall stands in water between 20 and 40 meters deep, turtle capture was most effective when snorkelers and divers with SCUBA were present simultaneously. This method involved one or two divers swimming along the cliff wall at 10 to 15 meters depth, followed by one or two snorkelers at the surface. In this way, the faster snorkelers could follow turtles seen swimming away along the cliff, and turtles descending towards the seafloor could be pursued by the divers. Captured turtles were generally handled as described above, with the exception of very large animals captured by a single diver with SCUBA. In this situation, bringing the turtle to the surface could be accomplished by holding the turtle at the front nuchal notch and posterior end of the carapace and steering the animal towards the surface. When diver and turtle reach the surface, immediate assistance is necessary to prevent the animal from descending. A turtle sighting was hand-signalled to the others who then join in the pursuit of the turtle. One of two strategies was then employed: either one person would swim down towards the front or side of the animal to distract it while another person came from

behind the turtle to grab it, or one person captured a turtle by swimming down from directly above the animal. Grabbing both its front flippers was found to be the most effective way of immobilizing and bringing up a turtle. Caution was used when doing this as some individuals try to bite the hands when handled in this way.

The effort involved with finding and capturing turtles at the three main study areas (the Carabinero-Mujeres and Sardinera-Carmelitas reef and the cliff walls of El Norte and Monito Island) was 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 2001 was 2.03 hawksbills/hour (captures only), with on average 2.9 persons in the water. Table 1 gives a breakdown of CPUE's by survey sites. The cliff wall habitats of Mona -and especially Monito- have exceptionally high densities of hawkbill turtles. Survey transect start and end points were recorded by GPS with an approximate survey tracks.

Table 1. Catch per unit of effort (CPUE) during 2001 for each of the survey sites in the study area.

	Hours	Captures per hour	Captures + sightings per hour
Mona: Carabinero-Mujeres (reef)	**23.70**	**1.01**	**4.89**
Mona: Sardinera-Carmelitas (reef)	**15.23**	**0.79**	**1.25**
Mona: El Norte (cliff wall)	**17.80**	**2.92**	**6.52**
Mona: other areas (reef)	**1.02**	**1.97**	**1.97**
Monito (cliff wall)	**12.65**	**3.16**	**14.55**

During our month-long presence on Mona during 2001, we captured a total of 144 hawksbill and 5 green turtles. Turtles were caught primarily along the northwest half of Mona Island and around all of Monito Island. Hawksbill turtles ranged in size from 21.7 to 88.3 cm notch-tip straight carapace length (N-T SCL), green turtles ranged from 27.4 to 41.1 cm N-T SCL. One green turtle and 102 hawksbills were captured bearing tags applied in previous years (recaptures). Untagged hawksbill turtles measuring less than 30 cm SCL size class are considered new arrivals to the study area and in 2001 we found 24 such recruits.

Blood sampling

Blood and/or tissue samples were collected from 9 adult males, 4 adult females, 16 recruitment size hawksbills, and 3 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 Peter Dutton of the NMFS Southwest Fisheries Science Center, La Jolla, California, where the samples will be incorporated into the genetic materials archive.

Instrumentation

On 6 July 2001 off Playa Mujeres, a Mk7 time-depth recorder was retrieved from a 52.0 cm hawksbill, ID 92-045, which had been deployed on 6 September 2000. The recorder was attached together with a sonic tag to the posteriormost edge of the carapace. Although the recorder was retrieved intact, the unit malfunctioned and no dive information could be extracted .

Seawater temperatures

Water temperature records for mid-2000 to mid-2001 season were obtained for the for the Mona reef off Playa Mujeres (10m depth) and at Monito Island cliff wall site (15 m depth) of Mona Island using TidBit dataloggers. Measured water temperatures ranged seasonally from 25.5 to 29.6°C. Waters at the shallow Mona reef site heat up considerably during summer and with less exposure to currents results in elevated temperatures.

Surveys of the Mona nesting beaches were conducted weekly from July to December 2000, and at irregular intervals from January to February 2001. 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 9 July to 5 December 2001, we found a total of 548 hawksbill nests and 876 false crawls. The 2001 hawksbill nesting season on Mona Island showed a continued rise in the hawksbill nesting activity detected since 1994.

A subset of 110 nests were examined after hatching and yielded the following nest productivity parameters. Average nest hatching success, lower limit 82.6% (assuming live hatchlings encountered would have perished), upper limit 89.0% (assuming all live hatchlings would have eventually emerged). Mean clutch size was 143.1 eggs. No nest predation by pigs was observed.

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