2007 Report on Hawksbill Sea Turtle Activities

Hawaii Wildlife Fund

USFWS Permit TE829250-5

Hawai‘i Wildlife Fund
P.O. Box 70
Volcano, HI 96785

Report on 2007 Permit Activities - USFWS Permit TE829250-5

Introduction

Within the Hawaiian Archipelago, hawksbills predominately nest on Hawai‘i Island and lower numbers are also known to nest on the islands of Maui, Moloka‘i and O‘ahu. A statewide estimate is thought to be at least fifty reproductive females with only 6-20 of these nesting each year. In 2007, no hawksbill nesting occurred on Maui and Hawaii Wildlife Fund (HWF) devoted its efforts to a foraging study.

Little is known about the foraging ecology of critically endangered hawksbill sea turtles (*Eretmochelys imbricata*) in Hawaii. In 2007, HWF partnered with Shannon Graham in the Conservation Biology Masters Degree Program at the University of Hawaii Hilo to conduct foraging ecology research on the hawksbill turtle. The primary objectives of the foraging research are to identify foraging depth and preferred prey species of post-nesting females. Earlier tracking studies had shown that the majority of adult females migrate to the Hamakua Coast of Hawaii I. after nesting, however prey species of Hawaii hawksbills are only known from stomach contents of one dead animal as reported in Balazs (1978). From the latter study, only three sponges were found, but not identified to species.

This research was performed in collaboration with George Balazs (NMFS, Honolulu) and supported by information and volunteer assistance from the Hawaii Volcanoes National Park hawksbill monitoring program.

Methods

Transmitter Attachment

In August 2007, two satellite transmitters (Telonics model ST-20 A-1025), equipped with pressure sensor capabilities, were deployed on post-nesting females at Kamehame and Pohue Bay. Attachment methods of satellite transmitters conformed to procedures elucidated by Balazs et al. (1995). Data retrieved from the ARGOS system included transmission date, diving depths, dive count, and position coordinates. Dive count is the number of submergences at >20 seconds and depth bins were divided into increments of 10 meters.

Tissue Sampling

During the time of satellite transmitter deployment, tissues from the posterior edge of the hind flipper were collected by biopsy. The skin sampling region was deadened with 2% lidocaine hydrochloride and cleaned with betadine prior to sampling. A few mg of tissue were removed with a 6 mm biopsy punch. Samples placed in a sealed cryotube were stored on ice in the field, and frozen at -20°C in the lab until subsequent

analysis. Straight carapace length, width, and tag information from each turtle were recorded.

Stable Isotope Analysis

Tissue samples will be rinsed in distilled water and desiccated at 60°C for 48 hours. Dried samples will be granulated to fine powder with a razor and remaining lipids will be extracted with a chloroform solvent. Approximately 0.6 mg of dried homogenous tissue will be stored in sterilized tin capsules. Samples will be analyzed at the EPSCOR Analytical Lab by a DeltaV Isotopic Ratio Mass Spectrometer with a Costech Elemental Analyzer. Denoted as parts per thousand (‰), $\delta\ ^{13}C$ and $\delta\ ^{15}N$ values will be further investigated relative to the diet.

Animals and Locations of Activities

Turtle Identification (tag no.'s)	Site (of instrument deployment	Date
435X, R195, 440X, 1D51	Kamehame, Hawaii I.	August 8, 2007
1D58, 1D60, 1D61, 1D62	Pohue Bay, Hawaii I.	August 30, 2007

Results to Date

The hawksbill turtle from Kamehame (transmitter ser.#51057) traveled northeast on the windward side of the main islands and then veered southwest and west after Kauai. She swam well around the east of Johnston Atoll and then proceeded westward and is currently maintaining the westward heading (Fig 1).

The underwater schedule for diving data for this turtle (#50157) was programmed in 3 hour intervals. The highest dive count average ($\bar{X}$ = 39) took place at depths 0 to 10m (83%), between the hours of 1100 and 1400. The lowest average number of dives ($\bar{X}$ = 14.81) was documented between 2000 and 2300. Dive depths within the latter period were distributed over three depth bins (0-30m): 0-10m: 61%; 11-20m: 25%; and 21-30m: 7% (Fig 2).

The hawksbill turtle instrumented at Pohue Bay (transmitter ser.#51056) traveled west from her nesting site and swam along the leeward side of Hawai`i, then down the Hamakua Coast to Honomu. Based on her last few coordinates, she stayed offshore of Honomu, just north of Hilo, Hawai`i. (Fig 3).

Diving data for this hawksbill turtle (#50156) had a 12 hour underwater schedule. From 1400 to 0200, she spent 91% of her time at 0-10m; however, from 0200 to 1400 she spent more time in deeper depths (<40m). Dive count differences between the two periods were similar.

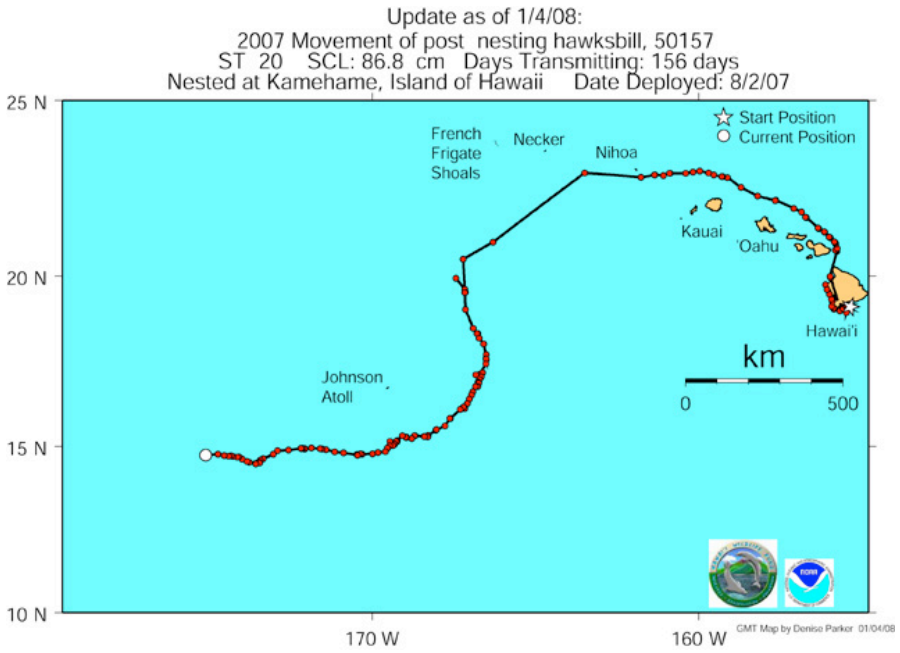

Figure 1. Hawksbill turtle 50157 movement patterns (Map created by Denise Parker)

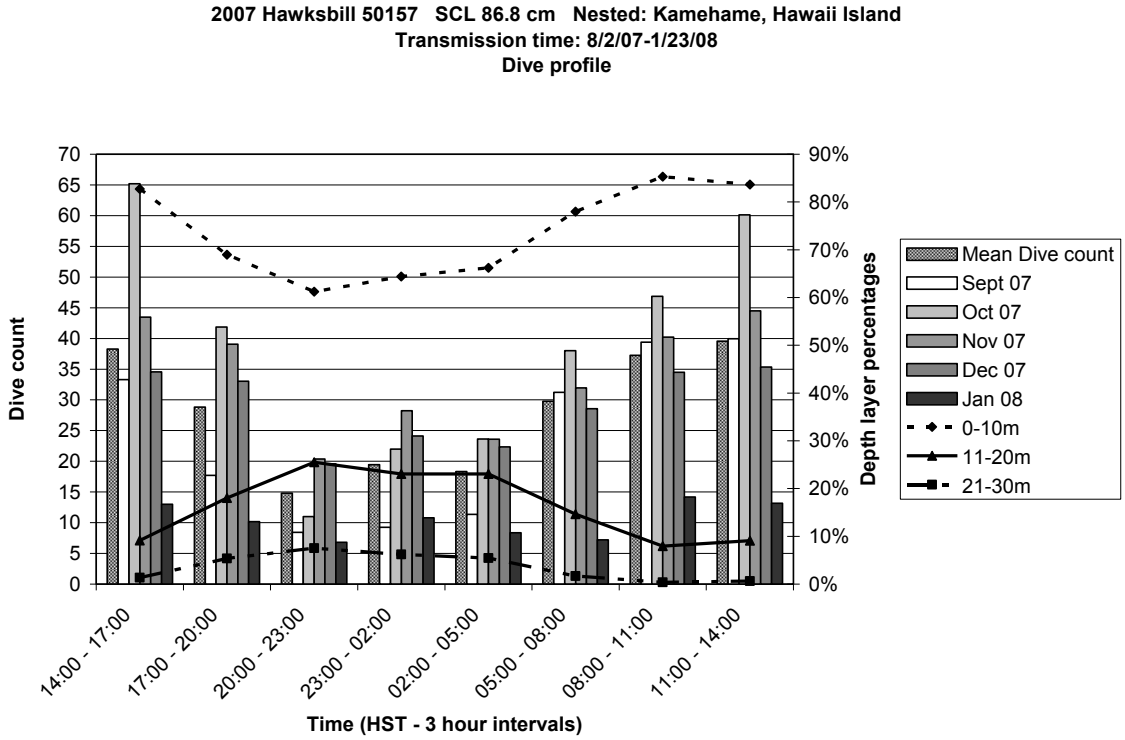

Figure 2: Hawksbill turtle 50157 dive profile (count and depth)

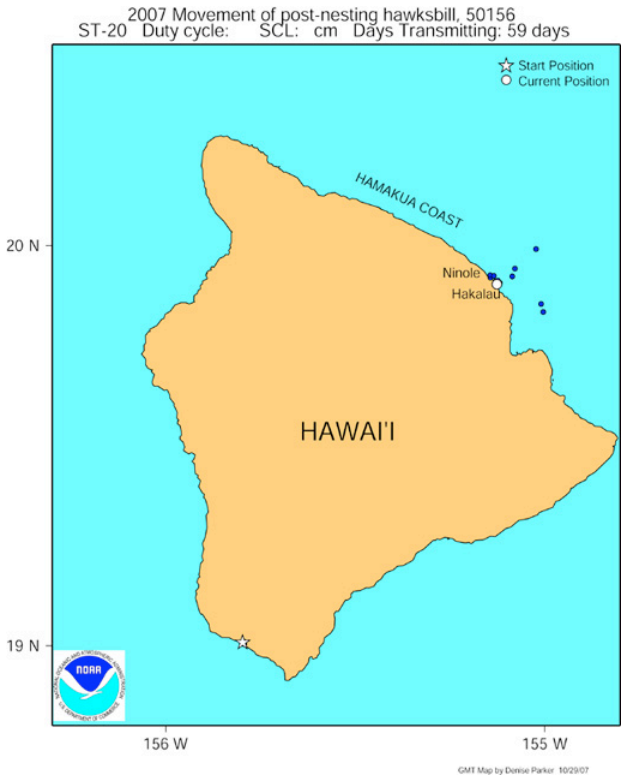

Figure 3: Hawksbill turtle 51056 movement patterns (Map created by Denise Parker)

Conclusions & Future Conservation Recommendations

This work is the beginning of a two-year research project. Two more transmitters will be put on hawksbill females in 2008 and the remaining take of 8 biopsies will be collected in 2008. Potential prey species will also be collected from the Hamakua Coast at depths we believe the females are feeding at. The potential prey stable isotope composition will be compared with the turtle tissue values to attempt to identify hawksbill prey preferences. Our goal is to have this work completed and a report drafted by the end of 2008.

Hawksbill turtles from other geographical locations feed primarily on sponges and average depth of feeding is <18m. Based on the two turtle movement patterns in this study, diving is limited to <30m. Shallow water environments are impacted directly and indirectly by anthropogenic activities. Sedimentation and run-off from coastal development can alter the ecology of coral reefs. As recommended by NMFS (1998), foraging habitats of sea turtles need to be elucidated to strengthen management programs. This foraging assessment will help decipher the foraging ecology of these endangered sea turtles and pinpoint hotspots and prey species that may need future conservation efforts.