

A HAWKSBILL TURTLE IN KANEOHE BAY, OAHU

by George H. Balazs

The hawksbill turtle, *Eretmochelys imbricata*, occurs in Hawaiian waters in small numbers exclusively around the large volcanic islands in the southeastern portion of the 1600 mile long archipelago. Few data have been presented for this indigenous species, in contrast to the more abundant, widely distributed, and colonial nesting Hawaiian green turtle, *Chelonia mydas*. Populations of the hawksbills at other geographical locations have also received comparatively less research attention, undoubtedly due to the more solitary nesting habits of the species, and hence their reduced accessibility.

Although not a central focus of research, *Eretmochelys* has nevertheless attracted considerable attention in many areas as the object of commercial exploitation. The principal product utilized is the thick translucent laminae (keratinized plates) of the carapace, known historically as tortoiseshell. Carr (1972) has described the array of survival problems which internationally confront the hawksbill, thereby suggesting that this may be the world's most endangered marine turtle.

Although the hawksbill turtle in Hawaii has probably not been directly exploited in recent times, it has on occasion been taken incidental to harvesting efforts aimed at green turtles. Ancient Hawaiians, however, are known to have specifically sought out hawksbills for laminae, which were used both for medicinal purposes and to fashion fish-hooks and other implements.

Except for hatchlings (P. Kawamoto, quoted in Ernst and Barbour (1972), and my own unpublished data), specimens of the Hawaiian hawksbill have not been previously examined for the purpose of documenting biological and ecological information. The recent recovery of a dead specimen from Kaneohe Bay afforded me the opportunity to conduct such an examination. Additional information I have collected over the past five years on various natural history aspects of the Hawaiian hawksbill will be presented in a later paper.

FINDINGS

On 14 August 1977 a dead turtle entangled in a monofilament gill net was observed floating at the surface in Kaneohe Bay. Both the turtle and the net were retrieved and transported to facilities of the Hawaii Institute of Marine Biology on Coconut Island for inspection. The net was found to

consist of two joined sections, each measuring approximately 300 feet by 20 feet, with 2½ inch mesh. From the type of net, we know that the entire 600 foot length had originally been set on or near the bottom at a depth of approximately 45 feet. Buoyancy of the turtle resulting from gas formation of decomposition brought a portion of the net to the surface. Barnacles growing on the float line indicated that the net could not have been under water for longer than two weeks, while the stage of decomposition of the turtle suggested that entanglement and drowning took place not more than five days prior to recovery. Decomposing fishes consisting of papio (*Caranx*), opelu (*Decapterus*), and small hammerhead sharks (*Sphyrna*) were also present in the net. The net was subsequently returned to the owner, who indicated that after setting the gear, he had been unable to relocate it.

The turtle, shown in Figure 1, was identified as a hawksbill with measurements of 29 ¾ inches (75.6 cm) straight carapace length, 22 ¼ inches (56.5 cm) straight carapace width, 22 ½ inches (57.0 cm) plastron length, and 3 ¾ inches (9.5 cm) head width. The presence of a short tail for the size of the turtle suggested that the specimen was a female.

Several large barnacles (*Chelonibia testudinaria*) and a mat of epizoic algae (see Cribb 1969) were present on the carapace laminae that had not been lost from decomposition. All of the laminae of the plastron were still attached, with a total encrustation of 52 *C. testudinaria*. Dorsal and ventral surfaces of all four of the turtle's limbs hosted a low incidence of the burrowing barnacle, *Stephanolepas muricata*, embedded to an average depth of eight millimeters. This genus of cirriped is only known to occur on the hawksbill, with previous records confined to the South China Sea (Gravel 1905) and Ceylon (Nilsson-Cantell 1930). These interesting Hawaiian specimens have been submitted to the Bernice P. Bishop Museum and the Smithsonian Institution for inclusion in their permanent reference collections.

Close examination of each carapace lamina revealed at least five relatively distinct bands which may be representative of annual growth. Such bands are not normally present in marine turtles, and their occurrence has not been reported in the literature.

Dissection and removal of the plastron exposed a thick layer of orange fat, which

surrounded the body cavity and was present in particularly large quantities over the pelvic musculature. In contrast, few fat deposits were found internally associated with the various mesenteries. Probably due to the degree of tissue degeneration that had taken place, neither gonads nor ova could be located. The stomach and intestines were completely filled with food, consisting of three kinds of unidentifiable sponges. In analyses of stomach contents from 29 Caribbean hawksbills, Carr and Stancyk (1975) also found a predominance of benthic invertebrates, with the sponge, *Geodia*, and ascidean, *Styela*, comprising the major portion of food material.

Eight carapace laminae (two centrals, six laterals), the skull, mandible, humeri, and femurs were excised from the turtle, cleaned and retained as permanent reference material.

DISCUSSION

The documentation of this turtle from Kaneohe Bay suggests that the area may serve as feeding habitat for Hawaiian hawksbills. To my knowledge, previous sightings of hawksbills have not been made in Kaneohe Bay. However, this could be due to the inability of most people to distinguish the hawksbill from the more common green turtle. Kaneohe Bay is already recognized as an important resident feeding pasture for an aggregation of both juvenile and adult green turtles. If hawksbills do regularly occur at this location, the two species would not be in direct competition for food, since the Hawaiian green turtle is primarily herbivorous, feeding on certain benthic algae (e.g. *Codium*, *Ulva*, *Pterocladia*) and a marine spermatophyte,



Fig. 1. Dorsal view of dead hawksbill. Numerous laminae of the carapace were lost as a result of decomposition. The distinguishing characteristics of this species include an elongated beak and, in young specimens, serrated edges of the carapace and overlapping laminae.

Halophila. Competition could exist, however, for safe and acceptable shelter, such as caves and the undersides of coral ledges, which are regularly used by both turtles during periods of quiescence.

Fishing nets pose a serious threat to marine turtles in areas where substantial feeding and breeding take place. Shrimp trawl nets, in particular, are of international concern at the present time due to the number of turtles that drown incidental to the fishing effort (IUCN, 1975). Although the hazard of gill nets to turtles has not yet attracted major attention, the problem can be expected to intensify with increasing human populations and the concomitant use of nearshore areas for commercial and recreational fisheries.

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