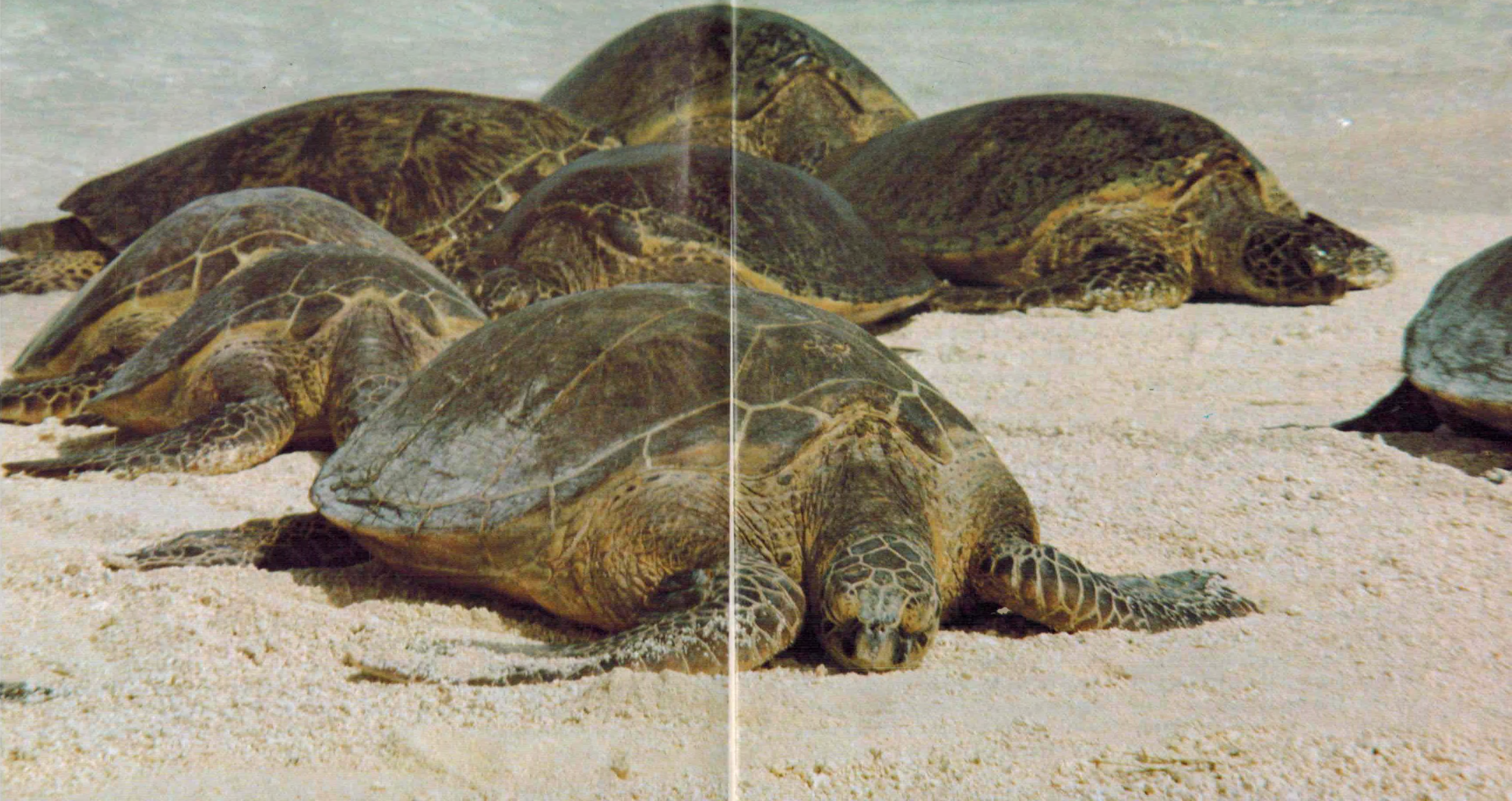


# Basking Green Sea Turtles

*Based on information provided by G. CAUSEY WHITTOW and GEORGE H. BALAZS*

*GREEN SEA TURTLES bask in the sun at French Frigate Shoals, Hawaii. Though a common sight on these islands, in other parts of the world green turtles rarely come ashore, except to lay eggs on the beach during breeding season.*

G. Causey Whittow



**E**XCEPT DURING the breeding season, when the female turtles crawl up the beach to lay their eggs, green sea turtles (*Chelonia mydas*) rarely set flipper on shore. They make an exception, however, in the Northwestern Hawaiian Islands — and possibly a few other locations — where they come ashore to bask.

On almost any day of the year, green turtles may be seen lying in the sun on the white coral sand of the small islands that make up Hawaii's French Frigate Shoals. They bask on other islands in the area, but those of the Shoals are their favorites. At times, there may be as many as two dozen turtles, high and dry, on a small island of less than 10 acres. And, once, on a larger island, Whale-Skate, 52 turtles were seen basking on the beaches.

### **The Lure of the Hawaiian Sun**

Green turtles in other parts of the world do not come ashore to bask in the sun, although there are reports that they formerly did so in the Galapagos Islands, and that they may continue to do so on Australia's Great Barrier Reef. Apparently, no other species of sea turtle engages in this activity.

Although basking occurs throughout the year at French Frigate Shoals, it is more prevalent during the breeding season (April through August). This may simply reflect the fact that there are many more turtles

10 acres=4 hectares

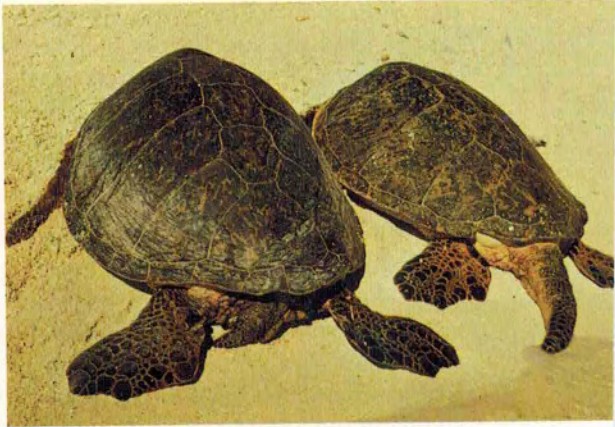
in the vicinity at that time. When mating activities and egg laying have been completed, many of the turtles leave, dispersing hundreds of miles throughout the Hawaiian Archipelago. Apparently some turtles at French Frigate Shoals never bask, while others, which do not bask when they are feeding near the main Hawaiian Islands, do so when they visit the Shoals for breeding purposes. (Turtles that had been kept in captivity in Honolulu for many years with no opportunity to bask, began to do so regularly when provided with a basking ramp. At Sea Life Park, an oceanarium on the Island of Oahu, turtles can be seen basking almost every day on an artificial beach of sand and concrete.)

Both male and female turtles bask. This confirms that basking and breeding activities are quite distinct, for although female turtles have to leave the ocean in order to lay their eggs, no part of the breeding behavior requires male turtles to come ashore. The presence of male turtles on land provides an unusual opportunity to tag the males and, subsequently, follow their movements. For other populations of green turtles, and for other species of sea turtles, the tagging of male turtles is contingent upon their being caught in the ocean, and hauled aboard a boat — no small undertaking with a large animal weighing up to 400 pounds.

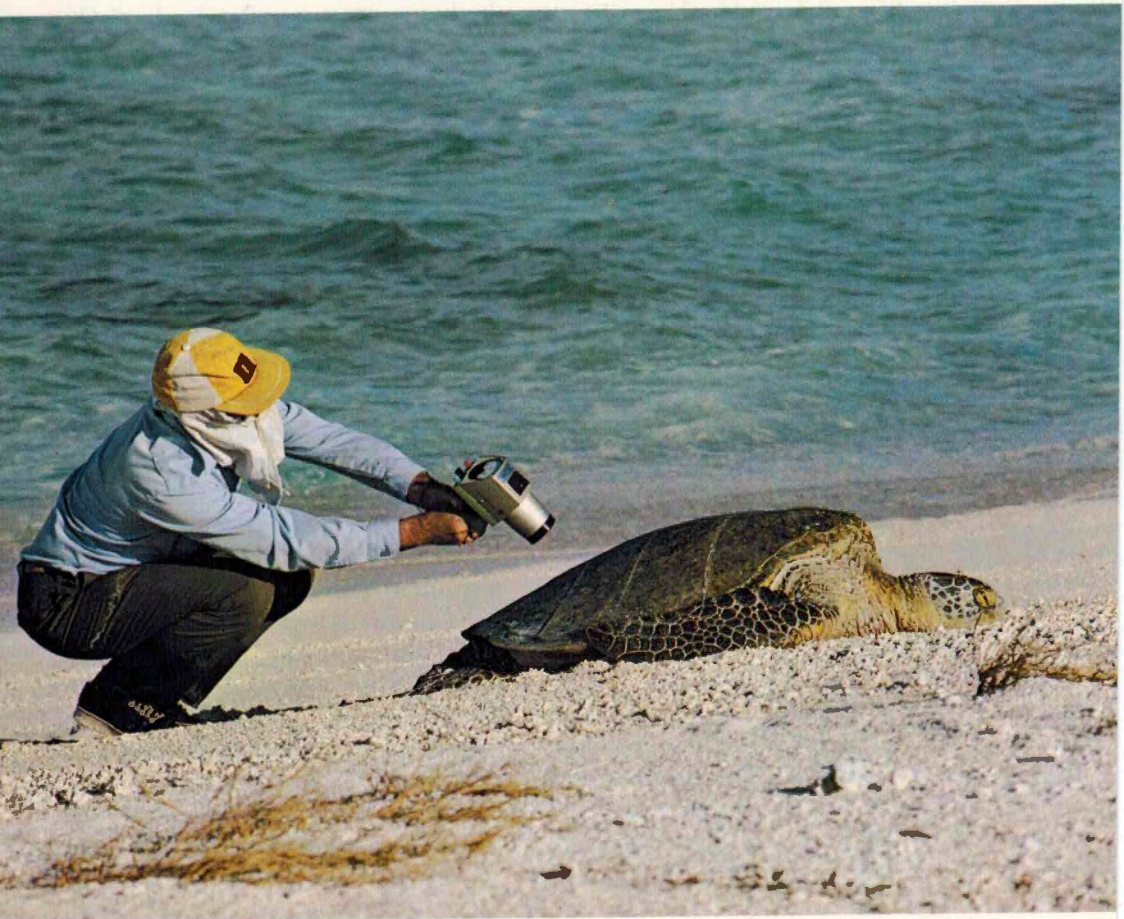
Although a lone turtle may be seen ashore early in the morning, the majority emerge from the ocean to bask late in the morning or during

400 pounds=181 kilograms

**BOTH MALE AND FEMALE green turtles (male has long tail) bask. Since males do not come to land as part of breeding activities, basking provides scientists an unusual opportunity to study them. Dr. G. Causey Whit-tow (below) uses a radiometer to measure the surface temperature of a turtle.**



Both photographs by George H. Balazs



the afternoon. They may remain ashore until the sun has set or leave after only a few hours. Their stay ashore seems to be related to the prevailing climatic conditions: the hotter the day, the more inclined they are to return to the ocean. Before they do so, however, many flip sand onto their carapaces. This keeps their shells from becoming too hot, as the sand contains moisture that evaporates and cools the carapace. The sand also reflects solar radiation, reducing the amount of heat that the turtles gain from the sun. They have never been observed basking when it was raining, but the incidence of basking was high on the first sunny day after a storm.

#### **Cooler Beach or Nearer Food?**

While doing these studies of the Hawaiian green sea turtles and their basking behavior, G. Causey Whittow, and George H. Balazs of the University of Hawaii found no evidence that the turtles orient their bodies so as to increase or decrease their solar heat load, as other reptiles do. In general, the turtles face the same direction for hours at a time.

The turtles appear to be selective in their choice of basking beaches. On the two islands studied, the basking beaches face the prevailing northeasterly trade winds, and these beaches are demonstrably cooler than the beaches on the opposite sides of the islands. These beaches, however, also face the fringing reef of French Frigate Shoals where the turtles may go to feed and rest underwater. Therefore, it is unclear whether the turtles select a cooler

beach or simply use the beach that is closest to their feeding grounds.

There is much to be learned about the significance of basking in sea turtles. They may benefit from basking in several different ways. Basking may be a means of increasing their body temperature by absorption of solar radiation, for measurements indicate that their body temperature does increase when they bask. One of the benefits of a higher body temperature might be an enhancement of digestive processes. Several other reptiles are known to increase their body temperature after feeding. On the other hand, basking may be an energy conservation measure. The turtles are extremely inactive when they are ashore, and a better understanding of the bioenergetics of basking may reveal that basking plays an important part in their overall energy balance. What is certain is that when the turtles are basking, they are secure from attacks by sharks. The tiger shark (*Galeocerdo cuvier*) is the main predator of sea turtles in the Northwestern Hawaiian Islands. Turtles have been recovered from the stomachs of tiger sharks, and turtles are consistently seen with parts of their flippers missing, presumably as a result of shark attacks.

From their observations, the scientists concluded that basking green turtles may absorb a significant amount of solar radiation, but the impact of any absorbed heat is lessened by two factors: by selection of a relatively cool beach for basking purposes, and by the complete inactivity of the turtles, apart from thermoregulatory behavior. Further-

more, they may be drawn to the basking beaches at French Frigate Shoals because of the reflective white sand, which never becomes really hot, and the prevailing northeast trade winds. As a result, the green sea turtles are able to stay on the beach — and to bask — for a relatively long period of time. □

RELATED READING:

Feazel, Charles T. "The Turtle Run: From Ascension to Brazil and Back."

*Sea Frontiers*, vol. 26, no. 4 (1980): 240–243.

Fletemeyer, John R. "The Lost Year." *Sea Frontiers*, vol. 24, no. 1 (1978): 23–26.

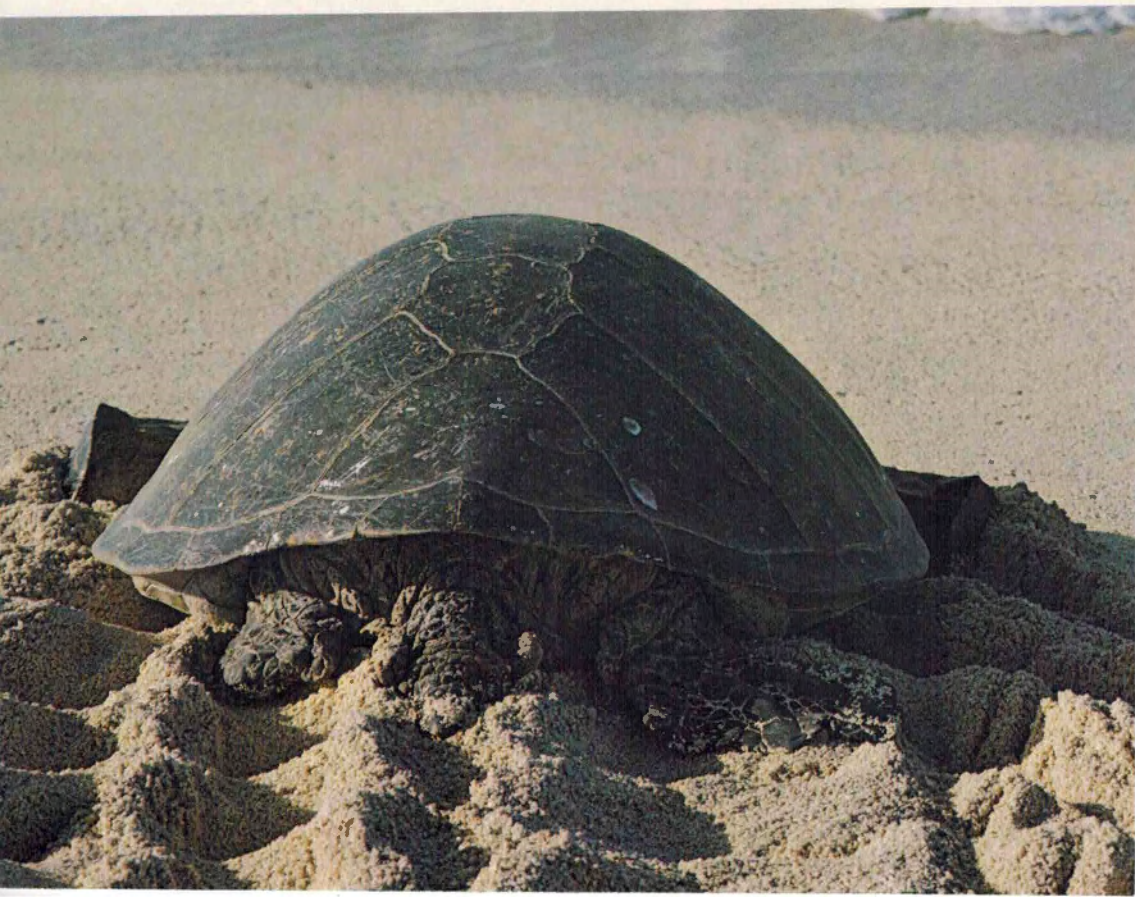
———. "Rare Albino Turtle." *Sea Frontiers*, vol. 23, no. 4 (1977): 233.

Reiger, George. "Green Turtle Farming." *Sea Frontiers*, vol. 21, no. 4 (1975): 215–223.

Bauer, Erwin A. "Hawaiian Island National Wildlife Refuge." *Sea Frontiers*, vol. 18, no. 6 (1972): 346–356.

TURTLES RETURN TO THE SEA after a few hours of sunshine, or may remain until sunset. Basking behavior may benefit the reptiles by increasing their body temperature, conserving energy, or allowing them to avoid predators.

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