

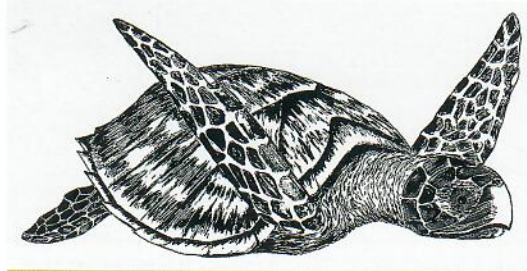
The Green Sea Turtle

Pūhā hewa ka honu i ka lā makani.

“The turtle breathes at the wrong moment on a windy day.”
A person says the wrong thing at the wrong time and suffers as a result.

As I snorkeled off Waikīkī, a Green Sea Turtle the size of a suitcase grazing on the algae growing on a dead coral head tolerated my proximity. I noticed the short tail that indicated this turtle was female. Her silted shell obscured her tortoiseshell pattern, so she seemed to appear and disappear as she drifted in the murky water. She was an ambassador from French Frigate Shoals, the sea turtle capital of Hawai‘i. Green Sea Turtles had nested on isolated beaches throughout the main islands until the mid-1950s, and although turtles are present near shore around all the islands, 90 percent of Hawai‘i’s Green Sea Turtles nest at just two islets in French Frigate Shoals.

Well before the Hawaiian Islands ever exploded above the ocean surface, sea turtles glided over them. Later, these ancient and elegant animals hauled out on the first Hawaiian beaches some 100 million years ago to lay round, gooey eggs before crawling back into the warm sea. Five species of



Save the sea turtle: E ho‘opakele i na honu o ke kai!

marine turtles visit Hawai‘i. The Hawksbill Sea Turtle is a rare and endangered species, nesting in small numbers on the black-sand beaches of the Big Island of Hawai‘i and on Maui.

Leatherback Sea Turtles have been seen in the pelagic zone surrounding Hawai‘i but do not nest in the state. Loggerhead and Pacific Ridley Sea Turtles, officially listed as threatened species, only occur as rare migrants.

The Green Sea Turtle or *honu* is the best-known marine reptile in Hawai‘i and throughout the world. It is also the most valuable reptile in the world because of its economic importance to coastal dwellers of the Tropics. The meat, the greenish fat from inside the top of the shell, and the cartilaginous “calipee,” found next to the lower shell, are made into soup. The shells are dried and polished for souvenirs, and the demand for turtle eggs has caused the species to decline worldwide.

Green turtles are recovering from wholesale harvest during the last 150 years in Hawai‘i. Expe-



Captain sitting on sea turtle, Laysan Island. (Bishop Museum photo)

In 1959, a fishing crew took 25 percent of the turtles at French Frigate Shoals. The profligate slaughter caught the government's eye and prompted some protection.

George Balazs of the National Marine Fisheries Service has been studying Green Sea Turtles at French Frigate Shoals since 1973. The foremost expert in Hawai'i on this species, his rallying cry: *E ho'opakele i na honu o ke kai*—"Rescue the turtles of the sea!" has been heard loud and clear. Numbers of Hawaiian Green Sea Turtles have increased under strict law enforcement since 1978 when they were listed as threatened under the U.S. Endangered Species Act. When I was at Tern Island in 1977 there were no turtle nests. Twenty years later, there were over 700 turtle nest pits! On East Island, when Balazs began his research, there were 69 nestings. In 1997 there were 504. During his long-term research he has tagged 2,000 breeding females as well as 3,900 others in Hawaiian waters. These tagged turtles represent most of the population.⁴

Sea turtles take an average of 25 years before they begin breeding. Nesting begins in May and continues through August, during which time a female lays 100–150 eggs in a sand pit dug into the

upper dry beach. After 50 to 70 days, depending on the temperature in the nests, the eggs hatch and the young turtles scramble to the surf. Along the way, some fall prey to ghost crabs. In the ocean, they must evade predators like sharks and jacks while presumably hunting zooplankton, their one stint of carnivory, because Green Sea Turtles are herbivores. After hatching, sea turtles are rarely seen until they are about 15 inches in length. Where they go during this growth period is still a mystery of the sea. But only about

1 percent of the turtles survive to breeding size.

Adult turtles often come ashore missing rear flippers and bite-sized portions of their carapaces. A study of Tiger Sharks found that the relatively slow-moving sea turtles are a substantial portion of their diet. Scientists fishing in 60 feet of water off Shark Island at French Frigate Shoals caught twelve sharks on ten hooks. Two 7-foot Galápagos Sharks got caught and attracted two Tiger Sharks, which ate the Galápagos sharks in a couple of bites, hooking themselves in the process.



Green Sea Turtle missing a rear flipper lost to shark bite.

The largest Tiger Shark, a magnificent monster over 14 feet long, had to be dispatched with four shots from a carbine rifle. In its stomach were six whole sea turtles, a shark's head, a Spinner Dolphin skull, one monk seal flipper, and the remains of Wedge-tailed Shearwaters, Eagle Rays, and Spiny Lobsters. But sharks and sea turtles have evolved together for millions of years, so turtles have obviously found ways to survive in this dangerous environment.

The Hawaiian population of sea turtles is the only one to sleep out of the water. Basking is common, especially during breeding season, and may be a behavior that evolved as a protective measure against Tiger Shark predation as well as a method of raising their body temperature at locations where sea temperatures are cool. They usually bask on warm, sandy beaches but have even been observed basking on a shipwreck and on a huge tangle of fishnets at Pearl and Hermes Reef.⁵ Land basking has allowed Balazs excellent opportunities to study these creatures. By tagging turtles with numbered bands and gluing radio transmitters to their shells, Balazs has discovered their migration patterns. Three turtles were fitted with transmitters in 1991: two migrated from French Frigate Shoals to Kāne'ohe Bay on O'ahu, and one reached Johnston Atoll 400 miles to the south. Swimming south of the islands over deep water, they travel fast, averaging 1 mile per hour to return to their preferred foraging areas.⁶

Unfortunately, although the threatened Green Sea Turtle is recovering from overharvest, they have begun to suffer from a new disease. First spotted in Florida, it has spread to all oceans and increased alarmingly in Florida and Hawai'i during the 1980s. Turtles, especially large juveniles, develop noncancerous tumors around their neck, flippers, eyes, mouth, and internal organs. Called fibropapillomatosis, it is not fatal in and of itself, but the tumors block the throat, eventually causing starvation and increased vulnerability to entan-



Green Sea Turtles mating in the surf at Tern Island, French Frigate Shoals.

glement in fishing gear. As many as 12 percent of the nesting females at French Frigate Shoals have tumors, but over 50 percent of the turtles examined in Kāne'ohe Bay, O'ahu, exhibit them.⁷

The exact cause remains unknown, but a herpes virus has been detected in the tumors.⁸ The turtles' immune system may be compromised by environmental factors such as pollution, water temperature changes, or increased ultraviolet light exposure caused by the thinning of the atmospheric ozone layer. Scientists have attempted to treat the sea turtles with antibiotics and surgically remove the external tumors when possible; however, the tumors do regenerate and internal ones cannot be removed. Development of a vaccine is unlikely, so researchers are hoping to eliminate the possible causes in the ocean.

The large female turtle I saw off Waikīkī has probably been returning to French Frigate Shoals every few years to breed and will probably continue to do so for several more decades. In spite of the threat of a new disease, her breed are survivors since before the days of the dinosaurs.

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Isles of Refuge

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