

SEA TURTLES IN REFUGE WATERS

FLORIDA KEYS NATIONAL MARINE SANCTUARY

“Backcountry” is Home to Protected Sea Turtles

Due to low population numbers and threats to survival, loggerhead, green and hawksbill sea turtles are protected under the Endangered Species Act. All three species have been observed in the backcountry waters of the Key West National Wildlife Refuge. Refuge beaches have long been known as turtle nesting sites for green and loggerhead turtles, but in recent years the value of open waters to marine turtles has also been recognized and documented. The first evidence of sea turtles using refuge waters as foraging grounds came from satellite studies that tracked green turtles nesting on Florida’s east coast and panhandle, and in Mexico’s Yucatan Peninsula to refuge waters after the nesting season.

Scientists Investigate Foraging Sea Turtles

In 2007, using grant funds awarded by the U.S. Fish and Wildlife Service, scientists from Inwater Research Group and Florida’s Fish and Wildlife Research Institute continued their marine turtle research in the open waters of the refuge. To systematically document turtles in the water, scientists observed them from a tower on a small boat while traveling along random survey lines called transects. During these timed trips, turtles were identified and counted and their GPS positions were recorded. This survey method, which reported the number of turtles per kilometer of transect, allowed scientists to compare the abundance of turtles in one location to another. Some turtles were captured by scientists and brought aboard the boat where they were identified, weighed, measured, photographed and flipper tagged. Before releasing a turtle, blood was drawn for genetic studies.



A hawksbill turtle forages in backcountry waters.
Photo: Inwater Research Group

During the three-year study, 550 loggerheads, 1057 greens and 23 hawksbills were sighted on transects in the refuge and surrounding waters. A total of 353 sea turtles were captured (including 51 recaptures), tagged and released.

Key West National Wildlife Refuge was established by President Theodore Roosevelt in 1908. Managed by the U.S. Fish and Wildlife Service, the refuge contains 200,000 acres of seagrass meadows, hard-bottom, sandy bottom and shallow coral reef habitats and 2,000 acres of remote low-lying mangrove islands. These uninhabited islands are designated wilderness under the Wilderness Act of 1964 and are managed to preserve their natural character.

www.fws.gov/nationalkeydeer/keywest/

Refuge Provides Valuable Habitat for Large Loggerhead Turtles

The majority of sea turtles captured in this study were loggerheads and most of these were large subadults approaching maturity. Compared to other similar study sites in Florida, the refuge, along with Florida Bay, had higher proportions of large loggerheads. The coastal waters of the refuge and Florida Bay appear to provide important developmental habitat for individuals approaching maturity and for adults foraging between reproductive migrations. Like other sea turtles, loggerheads may make long migrations in between nesting seasons. Based on recapture data, most loggerheads had relatively small home ranges while in refuge waters. Some home ranges were maintained over months and years of residency, an indication that habitat in the refuge provides the right prey and in abundant quantities.

Loggerhead sightings from the boat, mostly of subadults, were calculated at 0.45 - 0.50 turtles per kilometer of transect, depending upon the region of the refuge. Turtles were more abundant in relatively shallow mixed hard-bottom habitats. Loggerheads use their strong crushing jaws to feed on bottom-dwelling invertebrates such as queen conch and spiny lobster.

<http://floridakeys.noaa.gov/>



Larger Green Turtles Observed Feeding in Herds

Green turtles feed on seagrass in shallow coastal waters and are the only sea turtles that are strictly herbivorous as adults. In this study, greens were most frequently sighted in mixed habitats where sponge and hardbottom communities were near seagrass pastures. Juveniles were seen resting under sponges between foraging excursions. The highest abundances of greens were found around the Marquesas Keys, 1.21 turtles per kilometer of transect, and west of the Marquesas Keys, 1.61 turtles per kilometer of transect.

Juvenile greens were observed feeding in the shallowest of waters where they were better protected from large predators such as sharks. Adult and subadult greens were observed foraging in small herds in deeper waters west of the Marquesas Keys. Herding may help protect turtles from large predators, especially when reef habitat is not available to offer shelter. In Florida, scientists rarely observe adult and sub-adult greens outside of the breeding season and this study is the first to document herding behavior among green turtles. The 34 adult and subadult greens captured in this study represent only a small portion of the number of greens found on this foraging ground, which is estimated to hold over 400 animals at any given time. In all other areas of the refuge only juveniles were captured. Juvenile greens seem to have relatively small home ranges; all recaptured individuals were found within one kilometer of their original capture location.



Scientists search for sea turtles in refuge waters from a small boat.
Photo: Inwater Research Group

Backcountry is Developmental Habitat for Young Hawksbills

Because Florida represents the northern extent of their range, hawksbills turtles are very rarely observed in Florida waters. However, the refuge contains a relatively high density of hawksbills and is one of only three sites in Florida where they are being studied. The backcountry appears to be an important developmental habitat for younger hawksbills. Juveniles use the shallow waters within the Marquesas Keys for foraging and reduced predation risk much the same as greens. In this area, hawksbills were seen resting or foraging for sponges (a key component of their diet) among hard-bottom and seagrass habitats. The most important area for hawksbills may be reef habitat in the northern part of the refuge where the highest density was measured, 0.11 turtles per kilometer of transect. The 82 turtles captured in this study ranged from juvenile to subadult. No adult animals were seen or captured. A total of 17 hawksbills were recaptured, some multiple times over months and years, indicating they have a high level of site fidelity to habitat in the refuge.

Many Turtles in Refuge Waters Originate Elsewhere

According to genetic analyses conducted on captured individuals, most loggerheads were hatched from rookeries in the southeastern United States, Cuba, and Mexico and most greens came from rookeries in Florida, Mexico and Costa Rica. Sea turtles are thought to return to their beach of origin to nest. Two of the ten adult female greens captured in the refuge were later found nesting on beaches on the Yucatan Peninsula in Mexico and a third had nested in Costa Rica before being captured, emphasizing the international importance of this foraging ground to green populations. Nesting of hawksbills in Florida is rare and may explain why no adult animals were observed. Genetic analyses on captured hawksbills shows that they came from nesting rookeries in Mexico, Puerto Rico and Cuba.

Protections Are Important to Survival of Marine Turtles

Backcountry open waters with expanses of seagrass and mixed hard-bottom habitats are important foraging grounds for various life stages of loggerhead, green and hawksbill turtles. Survival of these endangered and threatened species depends upon healthy young and sub-adult turtles surviving into adulthood. Even the smallest disruption by people or vessels approaching too closely can interfere with foraging. Changes in habitats, sea-level rise on nesting beaches, impacts from fishing gear and pollution are also threats to the survival of sea turtles populations. Prohibitions on operating personal watercraft, airboats, and hovercraft in the refuge and no-entry and buffer zones help shield turtles from human disturbance. Such restrictions also protect critical shallow water seagrass meadows from impacts that degrade habitat quality and affect sea turtle foraging and survival success.