

Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

Sea turtles, who are among the oldest creatures on earth, have remained essentially unchanged for 110 million years; however, they face an uncertain future. The many threats to sea turtles include encroachment of coastal development on their nesting beaches, encounters with pollutants and marine debris, accidental drownings in fishing gear, and international trade in turtle meat and products.

Information about these ancient nomads of the deep has, until recently, focused on nesting females and hatchlings because they are the easiest to find and study. The advent of new research techniques, such as satellite tracking technology, has allowed scientists to peer into other phases of their lives. Florida, a leader in sea turtle research and conservation, is home to the nation's only refuge designated specifically for sea turtles. On Florida's east coast, the Archie Carr National Wildlife Refuge, named after the pioneering researcher whose work first called attention to the plight of the sea turtles, serves as a nursery for approximately one-quarter of all loggerhead turtle nests in the Western Hemisphere.

Description

Sea turtles are air-breathing reptiles remarkably suited to life in the sea. Their hydrodynamic shape, large size, and powerful front flippers allow them to dive to great depths and swim long distances. After their first frantic crawl from the nest to the ocean, male sea turtles never return to the shore, and females come back only long enough to lay eggs.

There are seven species of sea turtle: green turtle, hawksbill, leatherback, loggerhead, olive ridley, Kemp's ridley, and flatback. All but the olive ridley and flatback are found in Florida. Sea turtles have long, narrow, wing-like flippers in place of forelimbs and have shorter, webbed flippers as hind limbs. Unlike their terrestrial

SEA TURTLES

Nomads of the Deep

relatives, they cannot retract their heads very far into their shells. In most sea turtles, the top shell, or carapace, is composed of many bones covered with horny scales or "scutes." Turtles are toothless but have powerful jaws to crush, bite, and tear their food.

The smallest of the sea turtles are the ridleys, weighing 85 to 100 pounds as adults. Leatherbacks are behemoths that can grow to 2,000 pounds. Most sea turtles grow slowly and have life-spans of many decades. Although sea turtles can remain submerged for hours at a time while resting or sleeping, they typically surface several times each hour to breathe.

In summer, an ancient reproductive ritual begins. The female, who usually nests every two to three years, leaves the sea and crawls ashore to dig a nest in the sand. She uses her rear flippers to dig the nest hole, where she deposits about 100 eggs the size of ping-pong balls. When egg-laying is complete, the turtle covers the eggs, camouflages the nest site, and returns to the ocean. Nesting turtles may return to the beach several times in a nesting season to repeat the process.

f a s t FACT

Female sea turtles often appear to be weeping as they nest; the main purpose of these tears is to remove salt from the turtle's body.

As is true for some other reptiles, the temperature of the sea turtle nest determines the sex of the hatchlings. Warmer temperatures produce more females, whereas cooler temperatures result in more males. Consequently, conservationists prefer to leave turtle eggs in their original location whenever possible so that sex ratios are determined naturally.

After incubating for about two months, the eggs begin to hatch. A few days later, 2-inch hatchlings emerge as a group. This mass exodus usually occurs



FAST FACT

The contiguous beaches of Brevard, Indian River, St. Lucie, Martin, and Palm Beach counties are the most important loggerhead nursery areas in the Western Hemisphere, attracting more than 15,000 female loggerheads each May through August.

at night. Under natural conditions, the hatchlings use the bright, open view of the night sky over the water to find their way to the sea. However, artificial lights on beachfront buildings and roadways distract hatchlings, causing them to travel away from the ocean and toward the brighter lights located inland. Because of this danger, many beachfront communities in Florida have adopted lighting ordinances requiring lights to be shut off or shielded during the nesting and hatching season.

A Sea Turtle Sampler: Florida's Five Species of Sea Turtles

Loggerhead (*Caretta caretta*)

The most common sea turtle in Florida, the loggerhead is named for its massive, block-like head. It is among the larger of the sea turtles; an adult weighs an average of 275 pounds. Its carapace, which is about three feet long, is reddish-brown on top and creamy yellow underneath; it is very broad near the front of the turtle and tapers toward the rear. Each of its flippers has two claws. As is true for all sea turtles, the adult male has a long tail, whereas the female's tail is short; however, a juvenile's sex cannot be determined externally.

The powerful jaws of the loggerhead allow it to easily crush the clams, crabs, and other armored animals it eats. A slow swimmer compared to other sea turtles, the loggerhead occasionally falls prey to sharks, and it is not uncommon to see an individual that is missing flippers or chunks of its shell. However, the loggerhead compensates for its lack of speed with stamina; for example, a loggerhead that had been tagged at Melbourne Beach was captured off the coast of Cuba 11 days later.

Green Turtle (*Chelonia mydas*)

Green turtles, named for their green body fat, were valued by European settlers in the New World for their meat, hide, eggs, and "calipee" (the fat, attached to the

lower shell, that formed the basis of the popular green turtle soup). Merchants learned that the turtles could be kept alive by turning them on their backs in a shaded area. This discovery made it possible to ship fresh turtles to overseas markets. By 1878, 15,000 green turtles each year were shipped from Florida and the Caribbean to England. In Key West, formerly a major processing center for the trade, the turtles were kept in water-filled pens known as "kraals," or corrals. These corrals now serve a benign role as a tourist attraction.

A more streamlined-looking turtle than the bulky loggerhead, the green turtle weighs an average of 350 pounds and has a small head for its body size. Its oval-shaped upper shell averages 3.3 feet in length and is olive-brown with darker streaks running through it; its lower shell, called the plastron, is yellow.

FAST FACT

Many of Florida's green turtles have numerous warts on their bodies called fibropapillomas. Researchers believe these growths are caused by a virus but have not yet isolated a specific pathogen. The number of green turtles with these tumors appears to be increasing.

Green turtles are found during the day in shallow flats and seagrass meadows. Every evening, they return to their usual sleeping quarters—scattered rock ledges, oyster bars, and coral reefs. Adult green turtles are unique among sea turtles in that they are largely vegetarians, consuming principally seagrasses and algae. Each year, from June through late September, approximately 100 to 1,000 green turtles nest on Florida's beaches.

Leatherback turtle (*Dermochelys coriacea*)

The leatherback is a fascinating and unique animal, even among sea turtles. It is larger, dives deeper, travels farther, and tolerates colder waters than any other sea turtle. Most leatherbacks average 6 feet in length and weigh from 500 to 1,500 pounds, but the largest leatherback on record was nearly 10 feet long and weighed more than 2,000 pounds.

The leatherback looks distinctively different from other sea turtles. Instead of a shell covered with scutes, the leatherback is covered with a firm, leathery skin and has seven ridges running lengthwise down its back. The turtle is black with white, pink, and cobalt-blue



highlights and has no claws on its flippers. It eats soft-bodied animals such as jellyfish, and its throat cavity and scissor-like jaws are lined with stiff spines that aid in swallowing this soft, slippery prey. A young leatherback in captivity, with a plentiful food supply, can consume twice its weight in jellyfish daily.

FAST FACT

Leatherback turtles can dive deeper than any other air-breathing animal except perhaps sperm whales and elephant seals.

True denizens of the deep, leatherbacks are capable of descending more than 3,000 feet and of traveling more than 3,000 miles from their nesting beaches. They are found throughout the Atlantic, Pacific, and Indian oceans, as far north as Alaska and Labrador. Researchers have found that leatherbacks are able to regulate their body temperature so that they can survive in cold waters. Leatherbacks are found in Florida's coastal waters, and a small number (from 30 to 60 per year) nest in the state.

Hawksbill turtle (*Eretmochelys imbricata*)

The hawksbill is a small, agile turtle whose beautiful shell is its greatest liability. Although international trade in hawksbill products has been banned in much of the world, its shell is still used in some European and Asian countries to make jewelry, hair decorations, and other ornaments.

The adult hawksbill weighs from 100 to 200 pounds. Its carapace is approximately 30 inches long and is shaded with black and brown markings on a background of amber. The scales of this kaleidoscopic armor overlap, and the rear of the carapace is serrated. Its body is oval-shaped; its head is narrow. Raptor-like jaws give the hawksbill its name. These jaws are perfectly adapted for collecting sponges, the hawksbill's preferred food. Although sponges are composed of tiny glasslike needles, this potentially dangerous diet apparently causes the turtle no harm.

Hawksbills, usually found in lagoons, reefs, bays, and estuaries of the Atlantic, Pacific, and Indian oceans, are the most tropical of the sea turtles. They are frequently spotted by divers off the Florida Keys, and a few nests are documented annually from the Keys to Canaveral National Seashore.

Kemp's ridley (*Lepidochelys kempii*)

The Kemp's ridley is the rarest, most endangered sea turtle in the world. It has only one major nesting beach, an area called Rancho Nuevo on the Gulf coast of Mexico. The location of this nesting beach was a mystery to scientists until the discovery of a 1947 film showing 40,000 Kemp's ridleys crawling ashore in broad daylight to lay eggs. Sadly, an "arribada" (from the Spanish word for arrival) of such awe-inspiring splendor can now be seen only on film. Fewer than 1,000 nesting females remain in the world.

The Kemp's ridley is small, weighing only 85 to 100 pounds and measuring from 2 to 2.5 feet in carapace length, but it has a tough and tenacious nature. Its principal diet is crabs and other crustaceans.

During the 1980s, many eggs were removed from the beach at Rancho Nuevo and incubated in containers. The hatchlings that emerged from these eggs were then raised for almost a year in a National Marine Fisheries Service facility in Galveston, Texas. When they were released, it was hoped that these "headstarted" turtles would have a better chance of survival than they would have had as hatchlings.

Unfortunately, there were many problems with this program. When it was discovered that the sex of turtle hatchlings was influenced by temperature, project workers realized that the method used to house the turtle eggs created an environment cooler than a natural nest on the beach, thus producing only male turtles. They also discovered that after release, many of the "headstarted" turtles did not behave like their wild counterparts. Many scientists worried that these "headstarted" turtles would never become reproducing adults. Although two "headstarted" turtles are known to have nested, headstarting is generally considered to be an inappropriate conservation technique for marine turtles.

Threats to Sea Turtles

Sea turtles face many threats from humans. They are hunted for their meat and shells, their eggs are stolen, and their nesting beaches are often degraded by condominiums, seawalls, and other structures. Hatchlings are lured to their deaths by the artificial lights on developed beaches; juveniles and adults may die after consuming discarded plastic bags, balloons, and other marine debris. Turtles of all sizes and ages may be



drowned in shrimp trawls and gill nets. However, strong conservation measures offer hope that their future may not be so precarious. International treaties now prohibit trade in sea turtle products and impose high fines or prison terms on violators, but not all nations with sea turtle populations have signed these pacts.

Many important nesting areas, including those in Florida, are at least partially protected from both human disturbance and natural predators such as raccoons, which have been known to sit directly behind nesting turtles and scoop up eggs as they are laid. Protection of nesting beaches remains a key goal in the Florida Fish and Wildlife Conservation Commission's sea turtle conservation program.

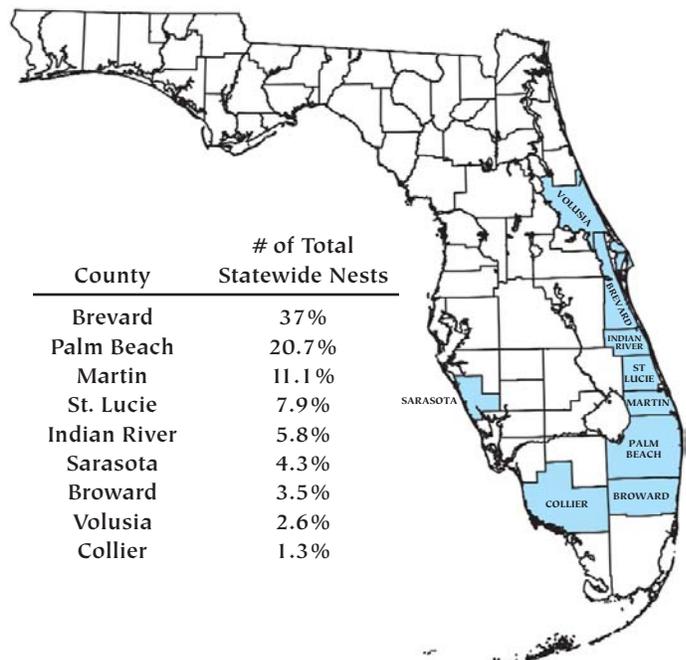
Managing coastal development on nesting beaches is another critical concern. State rules impose some limits on the construction of seawalls and other shoreline-hardening structures that can erode sandy nesting beaches, but such structures are still permitted in many areas where turtles nest. Additionally, beach renourishment projects designed to restore sandy beaches may pose a threat when they are conducted during the prime turtle-nesting season. It is not always possible to relocate all turtle nests in the path of the renourishment projects.

Perhaps the most important step forward for sea turtles came in 1989, when all shrimpers in the United States were required to use special "turtle-excluder devices," or TEDs, which allow turtles accidentally caught in nets to escape through a trap door. Before TEDs were required, an estimated 11,000 sea turtles died each year when they became trapped in shrimp nets and drowned. Kemp's ridleys were especially hard-hit by shrimping impacts. Increases since 1989 in the number of nesting Kemp's ridleys suggest that the TED regulations are reducing mortality. Biologists are also

teaching shrimpers in other countries to use these devices.

There are encouraging signs of recovery and positive action in Florida: the number of green turtle nests appears to be increasing slowly, and the number of dead turtles found on beaches is decreasing gradually. Many coastal construction and beach renourishment permits now incorporate sea turtle protection measures. The Florida sea turtle vehicle license plate is available for purchase, and its sales generate dedicated funding for research. Such efforts may indeed help to secure a bright future for these "living fossils."

Florida Counties with the Greatest Average Percentage of Loggerhead Nests, 2000-2005



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