# Resident Juvenile Sea Turtle Guild

**Kemp's Ridley Turtle** *Lepidochelys kempii*
**Green Turtle** *Chelonia mydas*
**Hawksbill Turtle** *Eretmochelys imbricata*

Contributor: Sally Murphy

DESCRIPTION

## Taxonomy

Samuel Garman first described the Kemp's ridley in 1880 as *Thalassochelys kempii*. It was named for Richard M. Kemp, a fisherman interested in natural history who submitted the type specimen from Key West, Florida (USFWS and NMFS 1992). Later *kempii* was allocated to the genus, *Lepidochelys*, when it was realized by Baur in 1890 that the Kemp's ridley and Indo-Pacific olive ridley were congener. Others considered *L. kempii* as a sub-species of *L. olivacea*. A review by Pritchard justified their status as a full, separate species and this determination is accepted by most authors (USFWS and NMFS 1992).

Linnaeus described the green turtle in 1758 as *Testudo mydas*. Schweigger first applied the binomial, *Chelonia mydas,* in 1812. Although trinomials have been applied to various populations in the past, they are generally not in use today (NMFS and USFWS, 1991).

The hawksbill was originally named *Testudo imbricata* by Linnaeus in 1766. Two subspecies (*Eretmochelys imbricata imbricata* in the Atlantic Ocean and *Eretmochelys i. bissa* in the Pacific and Indian oceans) are recognized. However, a complex pattern of phenotypic variation exists.

## Basic Description

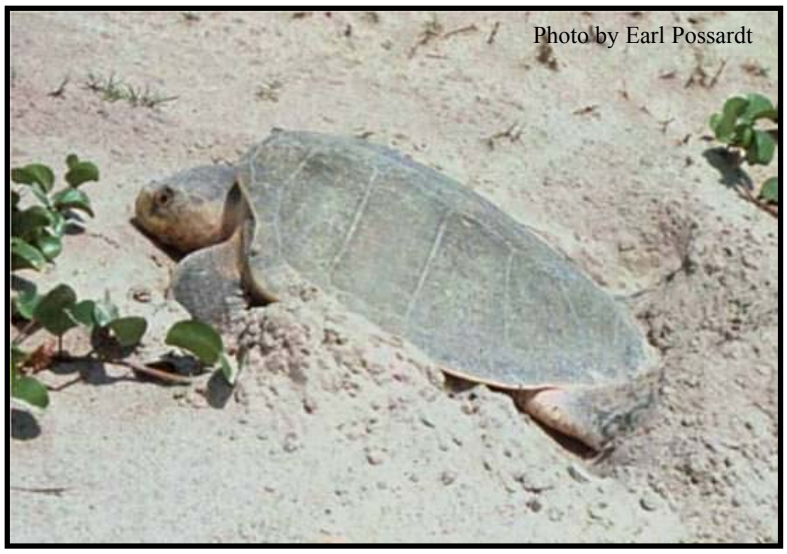
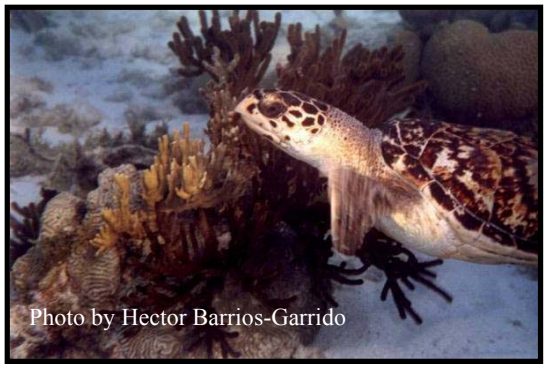


Photo by Earl Possardt

The Kemp's ridley turtle is one of the smallest sea turtles; it has an adult straight carapace length of approximately 65 cm (26 inches) and weighs less than 45 kg (99 pounds). Adults have an almost round carapace that is sometimes wider that it is long. The coloration changes significantly during development from the almost black hatchlings to the lighter, grey-olive carapace and cream-white or yellowish plastron of adults. There are four inframarginal scutes, each of which contains a pore. Hatchlings generally range from 42 to 48 mm (1.7 to 1.9 inches) straight carapace length and weigh between 15 and 20 g (0.5 and 0.7 ounces) (USFWS and NMFS 1992).


Green turtles are the largest of the hard-shelled sea turtles with adults reaching a meter (3.3 feet) in carapace length and 150 kg (330 pounds) in weight. They have a smooth carapace with four pairs of lateral scutes and a single pair of elongated prefrontal scales between the eyes. The plastron remains a yellowish white, but the carapace changes color from solid black to a variety of shades of grey, green, brown and black in starburst or irregular patterns. Green turtle hatchlings are about 50 mm (2.0 inches) long and weight about 25 g (0.88 ounces).

Adult hawksbills are usually larger than ridleys, but smaller than other sea turtles. Shell length for nesting females varies between 62.5 and 95 cm (25.0 and 37.0 inches) in the Atlantic. The turtle has four pairs of overlapping scutes; a long neck compared to other sea turtles and the adult shell is usually amber with streaks of red-brown, black-brown and/or yellow. The plastron is whitish yellow and may have some black spots.




**Status**

Kemp's ridleys were listed as endangered throughout their range (Federal Register, December 2, 1970) and are the most seriously endangered of the sea turtles.

Green turtles were listed as threatened under the U.S. Endangered Species Act of 1973. Breeding populations in Florida and on the Pacific coast of Mexico were listed as endangered.

Hawksbills were listed as endangered in 1973. They are also listed as endangered by the International Union for the Conservation of Nature and Natural Resources (IUCN) and are listed in Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Kemp's ridleys and green turtles use South Carolina waters as developmental foraging grounds. Hawksbills are rarely seen in South Carolina waters[1]. Since all of these species are juveniles, not nesting turtles, the conservation objective focus on the marine environment.

POPULATION DISTRIBUTION AND SIZE

In 1947, over 42,000 nesting Kemp's ridleys were estimated in a single day's arribada (mass nesting) (Hildebrand 1963). Their numbers have precipitously declined since then. The nesting population produced a low of 702 nests in 1985 (Ross et al. 1989). This initial decline was brought about by decades of harvesting females and the exploitation of eggs. Exploitation was

brought under control in 1976 when Mexican marines and biologists began protecting nesting females and their nests. In 1978, the program expanded into an international effort with the assistance of U.S. biologists (Ross et al. 1989). Since the mid-1980's, the number of nests laid in a season has been increasing primarily due to nest protection efforts and implementation of TED regulations for shrimp trawlers. During the 2002 and 2003 nesting season, more than 6,436 and 8,288 nests, respectively, were deposited on nesting beaches in Mexico.

In U.S. Atlantic waters, green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico; they nest in larger numbers along the east coast of Florida. Nesting in Florida has been on the increase, although the annual nesting effort fluctuates by a factor of ten. On high years, annual nesting is in the low thousands. In the past, green turtles were fished commercially in Florida and Texas (Hildebrand 1982).

Female hawksbills are solitary nesters with nests laid quickly and hidden under vegetation (NMFS and USFWS, 1993). Therefore, the hawksbill is a difficult turtle to census by aerial surveys. Because of the general lack of intensive effort needed to survey hawksbill populations, reliable estimates for the population size are available for only a few localities. The species is recorded in the continental U.S. from all the Gulf States and from along the eastern seaboard as far north as Massachusetts, but sightings north of Florida are rare (NMFS and USFWS 1993).

## HABITAT AND NATURAL COMMUNITY REQUIREMENTS

The major foraging habitat for Kemp's ridleys is the nearshore and inshore waters of the northern Gulf of Mexico as well as the Gulf of Campeche in the southern Gulf of Mexico. Kemp's ridleys are often found in salt marsh habitats. This turtle nests primarily on a beach near Rancho Nuevo in Tamaulipas, Mexico. This locale is the only place in the world where large nesting aggregations of the species are known to occur (TEWG 2000). Recently, nesting has been documented along the coast of Texas (Shaver and Caillouet 1998); it occurs as a very rare event in the Carolinas and Florida (Bowen et Al. 1994).

When they reach a carapace length of about 20 to 25 cm (7.9 to 9.8 inches), green turtles leave oceanic habitats and become benthic herbivores. Feeding grounds are relatively shallow, sheltered waters. Most commonly, these foraging habitats are pastures of seagrasses and/or algae. Some feeding grounds only support certain size classes of green turtles; in South Carolina, green turtle size class ranges from 28 to 38 cm (11 to 15 inches) (unpublished data, SCDNR).

Hawksbills are a circumtropical species, preferring warm shallow water areas such as coral reefs, lagoons, shoals and bays. They are omnivorous and eat plants and animals such as algae, sea grasses, soft corals and jellyfish, but sponges are the principal diet of hawksbills once they enter shallow coastal waters and begin feeding on the bottom (NMFS and USFWS 1993).

## CHALLENGES

Although green turtles probably have always been an important source of protein for coastal dwellers, the commercial exploitation from the 16$^{th}$ to 18$^{th}$ centuries decimated stocks (Mager

1985). There are only four recorded nesting records for green turtles and only one nesting record for Kemp's ridley in South Carolina (Hopkins-Murphy et al. 1999). There are no records of hawksbill nesting in South Carolina. Should nesting of these species increase, the following threats would also affect these species.

Loss or degradation of nesting habitat from coastal development and beach armoring could adversely affect these nesting turtles. Of the 303 km of coastline, about 70 percent is suitable nesting habitat. Of the 30 percent that is not suitable, two-thirds of it is the Grand Strand in Horry County. The other third is a combination of natural eroding beaches and previously built sea walls. Even if a suitable sandy beach is available, nesting can be aborted because of beach furniture and equipment blocking access to nest sites. Beach vitex, an exotic introduced plant has recently taken over areas in northern Georgetown and Horry Counties. Its aggressive growth and impenetrable roots quickly cover the dunes, making them unsuitable for nesting.

Uninformed visitors using flashlights at night can cause females to avoid certain areas and beachfront lighting will disorient hatchlings. Excessive predation by native and non-native predators as well as erosion and storm events, destroy nests. Killing of adults is rare, but human poaching of turtle nests with clandestine markets for eggs continues to be a problem (NMFS and USFWS, 1991).

Major challenges are associated with incidental take from commercial fishing operations. Additionally, the shark longline fishery, which operates all year long off the south Atlantic, may impact sea turtles in the neritic environment. Sea turtles can become entangled in a wide variety of materials including fishing line, rope, onion sacks and discarded netting. They also ingest many types of marine pollution and debris, resulting in gut blockage. Watercraft and ship strikes are becoming more prevalent as more and more people move to the coast. Natural mortality factors include predation by large sharks, disease and parasites (NRC 1990).

Green turtles appear to reside in the more sheltered estuarine creeks and marshes and are thus not exposed to the threat of incidental catch in shrimp trawlers. While Kemp's ridley are the second highest species recorded as stranded carcasses, the green turtle rarely strands, even though we know they occupy state waters during the warmer months of the year (unpublished data, SCDNR).

Green turtles also develop lobulated tumors (fibropapilloma) on their skin, scales, scutes, eyes (including surrounding tissues), oral cavities and viscera. The cause of this disease is unknown, but it has increased to epidemic proportions in areas as far apart as Florida and Hawaii (Balazs and Pooley 1991). None of the live captures or stranded carcasses in South Carolina have shown signs of this disease.

The main cause of depletion of hawksbill populations is the exploitation of eggs, meat, shell and whole young animals that are stuffed and sold as curios to tourists (NMFS and USFWS 1993). However, the greatest challenge for this species is the continuing demand for "tortoise shell" or the carapace and plastral scutes of the animal. These are reworked to produce hairpins, broaches, fans, inlayed furniture, eyeglass frames and numerous other items (Mager 1985). Another threat in the marine environment is to the coral reef habitat upon which hawksbill depend. Anchors

and anchor chains of cruise ships and yachts are destroying portions of the reefs, and some ships run aground, causing widespread damage (NMFS and USFWS 1993).

## CONSERVATION ACCOMPLISHMENTS

Kemp's ridley nesting beach protection at Rancho Nuevo was significantly increased over the past two decades; there has also been an increase in the number of Kemp's ridley nests documented at Rancho Nuevo since 1985 (Márquez-M. et al. 2005). Also, increasing number of Kemp's ridley nests are being laid annually on the Texas coast, some of which are "head-started" turtles (Fontaine and Shaver 2005).

Green turtle nesting is increasing in Florida (A. Meylan, pers. comm.) Research into the cause of fibropapilloma in green turtles is progressing and field studies have documented cases of natural remission of the disease (Hirama and Ehrhart 2002). This is encouraging since there was no known treatment or cure.

Japan ended import of hawksbill shell in 1993 and dropped its CITES reservation on sea turtles in 1994. Because Japan is the largest importer of hawksbill shells in the world, this should diminish the demand for the species (NMFS and USFWS 1993). The two most important hawksbill nesting beaches in the U.S. Caribbean are now fully protected (NMFS and USFWS, 1993).

The U.S. ratified Optional Annex V of the MARPOL Protocol in 1987, which prohibits dumping of all plastics and fishing gear from all ships at sea (O'Hara et al. 1988).

## CONSERVATION ACTIONS

- Ensure that live bottoms and marine algae habitats are protected from dredging and dredge spoil dumping through coordination with the U.S. Army Corps of Engineers.
- Map the location of juvenile sea turtle foraging areas for inclusion in protected areas.
- Increase number of estuarine sample areas conducted by SCDNR's Marine Resources Division to discover new foraging areas for juvenile sea turtles.
- Monitor all known juvenile sea turtle foraging areas to document changes in habitat condition, species composition, abundance and size classes in coordination with SCDNR's Marine Resources Division.
- Collaborate with other institutions, such as the South Carolina Aquarium and the College of Charleston to protect juvenile sea turtles.

## MEASURES OF SUCCESS

As new Recovery Plans are updated and Status Reviews are completed, we will review the needs of the species and implement research and/or management as indicated. If green turtle nesting should increase in South Carolina as it has in Florida, management actions to protect nests, as is done for the loggerhead, should be implemented.

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