

## Loggerhead turtle

*Caretta caretta*

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### DESCRIPTION

#### Taxonomy and Basic Description

The loggerhead was described by Linnaeus (1758) and named *Testudo caretta*. Over the next two centuries more than 35 names were applied to the species (Dodd 1988), but there is now general agreement on *Caretta caretta* as the valid name. The carapace, head scales, and dorsal scales of the flippers of adult and juvenile loggerheads are reddish-brown. The plastron, neck, ventral surface of the flippers and margins of the head scales are yellow, but with some variation. Adult loggerheads in the southeastern United States (US) have a mean straight carapace length of 92 cm (36.2 in.) and weigh about 113 kg (249 lbs.; NMFS & USFWS 1991).



Hatchlings lack the reddish tinge and vary from light to dark brown dorsally. Both pairs of flippers are dark brown and have distinct white margins. The plastron and other ventral surfaces are a dull tan. Hatchlings have three dorsal keels and two plastral keels. The mean straight carapace length is about 45 mm (1.8 in.); juvenile loggerheads weigh about 20 g (0.7 oz.) (NMFS & USFWS 1991).

#### Status

Globally, loggerhead sea turtle populations are considered to be in decline (NMFS & USFWS 2007), and are listed as endangered on the Red List of the International Union for the Conservation of Nature and Natural Resources and as Threatened or Endangered under the United States of America Endangered Species Act, depending on the distinct population segment (DPS, Federal Register 22 September 2011). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) lists loggerhead sea turtles in CITES Appendix 1. The US Loggerhead Recovery Team established five recovery units (possibly six, Shamblin et al. 2011) for the Northwest Atlantic Ocean DPS because loggerheads (1) are a wide ranging species, (2) have multiple populations, and (3) have varying ecological pressures and differing threats in different parts of their range. The Northern Recovery Unit (loggerheads nesting in Georgia (GA), North Carolina (NC), South Carolina (SC) and Virginia (VA)) is an order of magnitude smaller than the Peninsular Florida Recovery Unit.

## POPULATION SIZE AND DISTRIBUTION

The Northern Recovery Unit is the second largest recovery unit in the US. Annual nest totals from northern beaches averaged 5,125 nests from 1989 - 2008, representing approximately 1,272 nesting females per year (NMFS & USFWS 2008). SC nesting effort represents over 65% of the Northern Recovery Unit. However, the Northern Recovery Unit nesting population showed a significant declining trend of 1.3% annually from 1983-2008 (NMFS & USFWS 2008), although recent trends indicate that decreasing nest counts may be stabilizing (GADNR, NCWRC & SCDNR unpublished data).

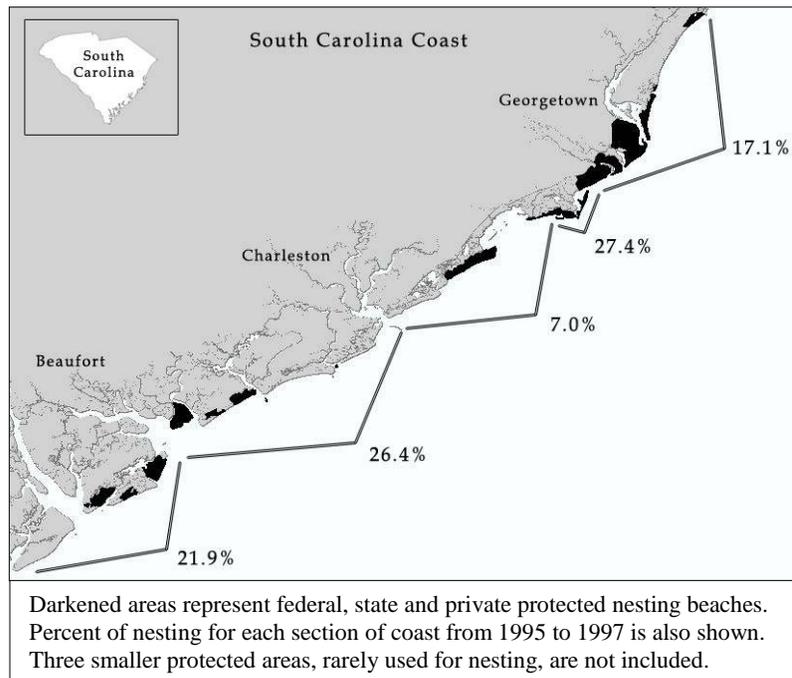
Research by the SC Department of Natural Resources (SCDNR) indicates that juvenile loggerheads in coastal waters off GA, SC and northern Florida are more abundant by an order of magnitude than they were in the late 1970's and early 1980's (Maier et al. 2004).

## HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Adult females inhabit coastal waters during the nesting season, from mid May to mid August; during this time they are not feeding. After nesting, females migrate to foraging areas both north and south of their nesting beaches. The predominate pattern for SC females is to move to the Mid-Atlantic Bight until November and then return south of Cape Hatteras, NC during winter.

In spring, they return to their same foraging area as the previous season. They repeat this until it is time for their breeding migration back to the nesting beach (Hawkes et al. 2011; SCDNR unpublished data).

Loggerhead turtles nest on ocean beaches within the continental US from Texas to VA. Major nesting concentrations are found on the coastal islands of GA, NC and SC, and on the Atlantic and Gulf coasts of Florida. Nests are typically made between the high tide line and the primary dune front (NMFS & USFWS 1991).



Juveniles from the various recovery units mix on foraging grounds, which include estuarine, neritic, and continental shelf waters in the Gulf of Mexico and the eastern seaboard. Juveniles, 40 to 91 cm (15.7 to 35.8 in.) in length are found in SC on a seasonal basis from early April to early November (NMFS & USFWS 1991).

## CHALLENGES

Because of their highly migratory behavior, conservation efforts for loggerhead populations in one country and/or state may be offset by activities in another.

Major challenges faced by loggerheads include loss or degradation of nesting habitat from sea level rise, erosion, coastal development, and beach armoring, although beach armoring is no longer allowed in SC. Of the 303 km (188.3 mi.) of coastline in SC, about 70% is suitable nesting habitat (Hopkins-Murphy et al. 1999). Of the 30% 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 (*Vitex rotundifolia*), an exotic introduced plant, has the potential to quickly cover the dunes, making them unsuitable for loggerhead nesting (R. Westbrook pers. comm.).

Climate change is a potential threat to sea turtles as it may affect these species in three ways: (1) loss of dry sand beaches to sea level rise or inundation of existing nests (Daniels et al. 1993; Fish et al. 2005; Baker et al. 2006); (2) lethal high temperatures within the nest that would cause egg/hatchling mortality or decrease hatchling fitness; or (3) a female biased sex ratio of hatchlings due to increased nest temperatures (Glen and Mrosovsky 2004). Sea turtles, like some other reptiles, have temperature-dependent sex determination (TDSD) with higher temperatures favoring the development of female offspring and lower temperatures favoring males (Spotila 2004). Foraging grounds in the marine environment may also be affected as sea water temperatures and acidification increase.

Uninformed visitors using flashlights at night can cause females to avoid certain areas while beachfront lighting disorients hatchlings. Excessive predation by native and non-native predators, as well as erosion and storm events, destroy nests (NMFS & USFWS 1991). Feral hogs and coyotes are reproducing and destroying loggerhead and bird nests as well as negatively impacting the maritime forest community on some coastal islands (NMFS & USFWS 1991). Killing of adult loggerheads is rare, but human poaching of turtle nests with clandestine markets for eggs may continue to be a problem (NMFS & USFWS 1991).

Another major impact on all sea turtles results from incidental take from commercial fishing operations. In a 1990 study, the National Academy of Sciences estimated that between 5,000 and 50,000 loggerheads were killed annually by the shrimping fleet in the southeastern Atlantic and Gulf of Mexico (National Research Council 1990). Other trawl fisheries are known to capture sea turtles, but capture rates are currently not available. In SC, these fisheries include: blue crab, whelk, and cannonball jellyfish. Although incidental take has decreased in recent years, this continues to be a major problem for sea turtles. The shark longline fishery, which operates all year long off the south Atlantic, may impact loggerheads in the neritic environment (Lewison et al. 2004). Loggerheads have been found entangled in a wide variety of materials including fishing line, crap pot lines, rope, onion sacks, and discarded netting (NMFS & USFWS 1991). They also ingest many types of marine pollution and debris, resulting in gut blockage (NMFS & USFWS 1991). Vessel interaction has become more prevalent. During 2011, 31% of

stranded sea turtles had wounds indicating vessel interaction (SCDNR unpublished data). Natural mortality factors include predation by large sharks, disease, and parasites (NMFS & USFWS 1991).

Degradation of foraging habitat by physical damage occurs when there is trawling over live bottoms. Clam dredges can cause similar damage in the more offshore areas. Over-harvesting of prey species, such as horseshoe crabs and whelks, can deprive loggerheads of their food resource, resulting in longer remigration intervals between nesting (Bjorndal 1997). Data on the quantity and quality of foraging habitat is scarce.

## CONSERVATION ACCOMPLISHMENTS

Some conservation accomplishments achieved for this species span a regional scale by federal agencies while others were made locally in South Carolina (Hopkins-Murphy 1987). The Sea Turtle Stranding and Salvage Network (STSSN) was established in 1980 to document the number of sea turtle carcasses that wash ashore. Nest protection projects were established along the South Carolina coast from 1981 to the present to increase hatchling productivity (Hopkins-Murphy et al. 1999). Over 70% of the nests laid in SC are under nest protection management and achieve at least a 60% hatching success (Hopkins-Murphy et al. 1999). Statewide aerial beach surveys were flown from 1980 to 2007 to provide a standard index for monitoring the nesting population (Hopkins-Murphy et al. 2001). More recently, a regional genetics research project conducted by state sea turtle coordinators in GA, NC and SC in collaboration with the University of Georgia is answering critical reproductive biological questions.

The loggerhead turtle was designated the State Reptile of SC in 1988 (Act # 588, June 1, 1988). South Carolina became the first state to enact Turtle Excluder Device (TED) regulations in 1988. Federal regulations requiring TEDs in all waters, at all times came into effect in 1991. In 1991, South Carolina also became the first state to require the US Army Corps of Engineers to restrict hopper dredge channel maintenance to the winter months. South Carolina became the first state to enlarge TED openings in 2002. Federal regulations requiring larger TED openings came into effect in 2003. The US Fish and Wildlife Service produced and distributed large “Lights Out” signs that were erected on roadways leading to beaches. Volunteers have also produced numerous articles to inform beach residents and visitors about the necessity to have lights out during the nesting and hatching seasons.

In 2005, through a partnership of resources of NOAA Fisheries, SCDNR’s Environmental Education Program and the SC Department of Education, all public schools in this state have been provided copies of the interactive DVD “Journey of the Loggerhead.” Additionally, the South Carolina Aquarium Sea Turtle Rescue Program (SCA), which was begun in 2000, has successfully treated and released 100 sea turtles back to the wild (as of December 2012). SCDNR partners with the SCA staff on conservation projects and educational outreach.

Currently, Endangered Species Act Section 6 funding from both the US Fish and Wildlife Service and the National Marine Fisheries Service provides program support for the SCDNR Marine Turtle Conservation Program.

## CONSERVATION RECOMMENDATIONS

- Protect any remaining significant loggerhead nesting beaches that are still threatened with development through fee simple purchase or conservation easement (i.e. Bay Point).
- Continue to work with partners to model sea level rise with loggerhead nesting beaches in SC.
- Establish partnerships to determine the quantity and quality of foraging habitat.
- Ensure that important nesting beaches destroyed by storm events are restored. Collaborate with the US Army Corps of Engineers to complete beach restoration projects.
- Reduce feral hog and coyote populations on coastal islands.
- Ensure that predator control is conducted on important loggerhead nesting beaches.
- Consider establishing Marine Protected Areas based on satellite telemetry data of adult female loggerheads on resident foraging areas. This should be done in collaboration with the Atlantic States Marine Fisheries Commission, Fisheries Management Councils and relevant states.
- Increase education of boaters to raise awareness of sea turtles in our coastal waters.
- Collaborate with other states in the southeast on projects to determine the cause(s) of the increase in emaciated loggerheads that stranded in recent years.
- Ensure existing surveys that are providing a standardized index to the population are adequately funded.
- Continue to publicize and promote the “Lights Out” efforts and enlist the assistance of electric utility companies when necessary.
- Maintain and improve the SCDNR Marine Turtle Conservation Program web page.

## MEASURES OF SUCCESS

As research and management needs are identified, we will initiate projects to address those needs. This was done previously with TED opening sizes when they were found to be too small. Also, this is being done now with the management of beach vitex through the establishment of a Beach Vitex Task Force using funding from a National Fish and Wildlife Foundation grant.

Because there are multiple threats to loggerheads, both on the nesting beaches and at sea, there are likewise multiple management strategies being implemented to bring about their recovery. We may not know which ones have been responsible for recovery of the species, should population numbers on nesting beaches begin to increase. The state will work to implement any Recovery Plan Tasks where South Carolina is the Responsible Agency.

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