

Leatherback turtle

Dermochelys coriacea

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DESCRIPTION

Taxonomy

The leatherback is the largest and most migratory of the living turtle, with the most extensive geographic range (Eckert et al. 2012). It is so distinctive that it is placed in a separate family, Dermochelyidae. Blainville introduced the generic name *Dermochelys* in 1816. The binomial refers to the distinctive leathery, scaleless skin of the adult turtle. The specific name, *coriacea*, was first used by Vandelli in 1761 and adopted by Linneaus in 1766 (NMFS & USFWS 1992).



Basic Description

The carapace of the leatherback is distinguished by a rubber-like texture. It is black with white spots and has seven prominent longitudinal ridges, which taper posteriorly to a blunt point. No sharp angle is formed between the carapace and the plastron, resulting in the animal being



somewhat barrel-shaped; hence one common name was “trunkback.” The undersurface is mottled, pinkish-white and black and is highly variable. The mean curved carapace length for adult females nesting in the United States (US) Caribbean is 155 cm (61 in.) with weights of 262 to 506 kg (578 to 1274 lbs.) (NMFS & USFWS 1992). Leatherback hatchlings are dorsally mostly black and covered with bead-like scales; the flippers are margined in white and rows of white scales appear as stripes along the length of the back. In the US Virgin Islands, hatchlings average 61.3 mm (2.4 in.) in straight carapace length and 45.8 g (1.6 oz.) in weight.

Status

The leatherback turtle is endangered throughout its global range. It was listed as endangered on June 2, 1970 and is included on Appendix I of CITES (Convention on International Trade in Endangered Species) and is listed under the IUCN (International Union for Conservation of Nature) Red List as critically endangered. On January 5, 2010, the US National Marine Fisheries

Service proposed regulation to revise the critical habitat designation for the endangered leatherback sea turtle by designating additional areas of protection within the Pacific Ocean. The proposed addition measures approximately 70.6 mi.² and was designated in January 2012.

POPULATION SIZE AND DISTRIBUTION

Leatherback nesting beaches are distributed circumglobally. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on 28 major surveyed beaches, with a lower limit of about 26,200 and an upper limit of about 42,900 (Spotila et al. 1996). This is less than one third of the 1980 estimate of 115,000 (Spotila et al. 1996). The largest population is in the western Atlantic (Spotila et al. 1996). Leatherback nesting in Florida was once considered extremely rare, but now nests number in the hundreds annually (Meylan 2004). In North America, the northeast coast of Florida was considered the northern limit for leatherback nesting. In 1981, two confirmed leatherback nests were documented in Georgia on Cumberland and Blackbeard Islands. Today, leatherback nesting has been confirmed in South Carolina and North Carolina as well and, possibly, Maryland (Rabon et al. 2003). Since 1996, 21 leatherback nests have been documented in South Carolina (SCDNR unpublished data). There is no evidence of significant current declines at the largest of the Western Atlantic nesting grounds, but Eastern Atlantic populations face serious threats and Pacific populations have been decimated (Eckert et al. 2012; Tapilatu et al. 2013).

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Leatherbacks are highly migratory and are the widest ranging of all sea turtles. Information on habitat requirements for post-hatchling and juvenile leatherbacks is limited, with individuals smaller than 100 cm (39 in.) in carapace length confined to waters > 26°C (79°F) (Eckert et al. 2012). Their movements are no doubt in response to seasonal abundance of macroplanktonic prey, jellyfish, their major food item. An annual migration of adult and sub-adult leatherbacks from the wider Caribbean to the northwestern Atlantic results in spring and fall concentrations of leatherbacks in South Carolina waters. Nearshore concentrations of leatherbacks can occur from April to June during the northward migration when cannonball jellyfish (*Stomolophus meleagris*) are abundant (Murphy et al. 2006). Based on strandings, there is a second, less apparent peak, during the southward migration in October and November.

Nesting females prefer high-energy beaches with deep, unobstructed access that occurs most frequently along continental shorelines.

CHALLENGES

Leatherbacks are still occasionally killed for meat and oil in the Caribbean (NMFS & USFWS 1992). The theft of eggs for local consumption was once a problem in the US Virgin Islands, but has been all but eliminated as a result of nightly patrols and nest protection programs (NMFS & USFWS 1992).

Loss or degradation of nesting habitat from coastal development and beach armoring results in adverse impacts to leatherbacks. Even if a suitable sandy beach is available, nesting can be

aborted because of beach furniture and equipment blocking access to nest sites. Uninformed visitors using flashlights at night can cause females to avoid certain areas, and beachfront lighting will disorient hatchlings (NMFS & USFWS 1992). Ghost crabs (*Ocypode quadratus*) and yellow crown night herons (*Nyctanassa violacea*) are common hatchling predators on the beach at night (NMFS & USFWS 1992).

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 (TSD) 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.

Because of their very large front flippers, leatherbacks become entangled fairly often in longlines, float lines of crab and lobster pots, buoy anchor lines, and other ropes and cables. This can lead to serious injuries and/or death by drowning (NMFS & USFWS 1992; SCDNR unpublished data). Leatherbacks apparently mistake floating plastic bags and sheets for jellyfish and consume these materials. This can cause direct obstruction of the gut or absorption of toxic byproducts and reduced absorption of nutrients across the gut wall. Mrosovsky (1981) reviewed data from leatherback stomach content studies worldwide and concluded that approximately 44% of the adults examined had plastic in their stomachs.

The shrimp trawl fishery also captured leatherbacks until Turtle Excluder Devices (TEDs) were enlarged to allow their escape. They are also vulnerable to boat and ship collisions, particularly when inhabiting shallow, near-shore waters. Lewison et al. (2004) integrated catch data from over 40 nations and by-catch data from 13 international observer programs. They estimate that 50,000 leatherbacks were likely taken as pelagic longline by-catch in 2000. Eckert and Sarti (1997) reported that, “mortality associated with the swordfish gillnet fisheries in Peru and Chile represents the single largest source of mortality for Eastern Pacific leatherbacks.” Incidental mortality in fisheries, implicated in the collapse of the Eastern Pacific population, is a largely unaddressed problem worldwide (Eckert et al. 2012).

CONSERVATION ACCOMPLISHMENTS

Since 1981, intensive nest survey and protection efforts have been implemented at Sandy Point, St. Croix, US Virgin Islands. In 1984, the US Fish and Wildlife Service purchased the 2.4 km (1.49 mi.) long nesting beach at Sandy Point, which became a National Wildlife Refuge and designated as Critical Habitat under the Endangered Species Act of 1973. In South Carolina, nearshore aerial surveys have documented the spatial and temporal distribution of leatherbacks since 1993. The leatherback Conservation Zone was established as part of the Contingency Plan in 1995 (60 FR 25260, May 12, 1995; 60 FR 25663, May 12, 1995). Additionally, leatherback-sized TEDs were required in all shrimp trawls by the National Marine Fishery Service in 2003. On January 5, 2010, the US National Marine Fisheries Service proposed regulation to revise the

critical habitat designation for the endangered leatherback sea turtle by designating additional areas of protection within the Pacific Ocean. The proposed addition measures approximately 70.6 mi.² and was designated in January 2012.

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.

CONSERVATION RECOMMENDATIONS

- Protect areas of high leatherback concentration from activities that can have a negative impact on leatherbacks such as longlines, set nets and trawl fisheries that do not require effective TEDs.
- Conduct education programs that inform the public about the detrimental impacts of litter on aquatic organisms like the leatherback to assist in reducing the volume of plastics in the marine environment.
- Provide protection from predators and erosion for any nests that are laid on the beaches.
- Continue to work with partners to model sea level rise with leatherback nesting beaches in SC.
- Increase education of boaters to raise awareness of sea turtles in our coastal waters.
- Ensure a continued food source for leatherbacks by protecting the cannonball jellyfish from commercial over-harvest.
- Monitor stranded leatherbacks to determine the number, size, and distribution of mortalities and the source of tagged individuals.
- Perform post-mortem examinations of stranded leatherbacks to document cause of death, food habits, sex ratio, reproductive condition, and extent of ingestion of plastics.
- Continue to gain more information on leatherback distribution from the public through the Marine Turtle Conservation Program web site.

MEASURES OF SUCCESS

While Pacific populations of leatherbacks are in sharp decline, nesting populations in the Atlantic appear to be either stable or increasing. South Carolina research and monitoring efforts will be an important component to document future population trends in this endangered and unique animal. An increase in the number of nests may be considered a sign of successful management actions.

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