DNR

State of South Carolina's Coastal Resources

Loggerhead Sea Turtle Update

Introduction

The loggerhead sea turtle (*Caretta caretta*) is the most common sea turtle in South Carolina (Figure 1). Globally, loggerhead sea turtle populations are recognized as being depleted (NMFS and USFWS, 2007). Loggerhead nesting in South Carolina, Georgia and North Carolina comprises the Northern Recovery Unit (NRU) which is the second largest loggerhead nesting aggregation in the Northwest Atlantic. Nesting in South Carolina represents 68% of the NRU and is currently declining 1.9% per year (NMFS and USFWS, 2008). The loggerhead is listed as Endangered on the International Union for the Conservation of Nature Red List and as Threatened under the U.S. Endangered Species Act. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) lists loggerhead turtles in CITES Appendix 1. This species is also protected by the South Carolina Nongame and Endangered Species Conservation Act of 1976 and was designated the official South Carolina state reptile on July 28, 1988.

Figure 1. Adult loggerhead (Caretta caretta) sea turtle. Loggerheads are named for the size of their head relative to their body.

Loggerhead turtles are susceptible to a number of threats, both natural and man-made. These threats include but are not limited to watercraft interaction, disease, cold stunning, predators, entanglement in passive fishing gear, incidental capture in commercial and recreational fisheries, light pollution, nesting habitat degradation and beach erosion. Since loggerhead nesting is in decline, Recovery Objectives have been identified in the Loggerhead Recovery Plan (NMFS and USFWS 2008). The SCDNR Marine Turtle Conservation Program monitors nesting and stranding (turtles that wash ashore) trends, trains nest protection and stranding network participants and coordinates with various government agencies and private groups to mitigate factors impacting sea turtles. The SCDNR also works with the South Carolina Aquarium (SCA) to provide care to sick and injured sea turtles that strand alive on the beach. Effective management and coordination are crucial in monitoring populations, formulating protective regulations, making management decisions and maximizing reproduction for the recovery of threatened and endangered sea turtle populations.

SCDNR Aerial Survey Nesting Index

The SCDNR Marine Turtle Conservation Program is responsible for managing and protecting sea turtles in the state of South Carolina. The SCDNR began monitoring sea turtle nesting activities and strandings in the late 1970s, as well as applied research. Information gained from this program contributes to ongoing sea turtle nest management and protection projects on the state's beaches. Approximately 300 kilometers of ocean-facing barrier islands provide suitable nesting habitat for sea turtles. Since 1980, aerial surveys have been flown to establish an index of loggerhead nesting on South Carolina's beaches. Twelve aerial surveys were flown yearly for three years followed by two non-survey years. Standardized aerial surveys flown from 1980 - 2007 indicate a 1.9% annual decline in loggerhead nesting (Figure 2).

SCDNR Nest Management and Protection

SCDNR currently (2009) has 21 nest protection projects (includes the federal Cape Romain National Wildlife Refuge project) with over 800 participants who use

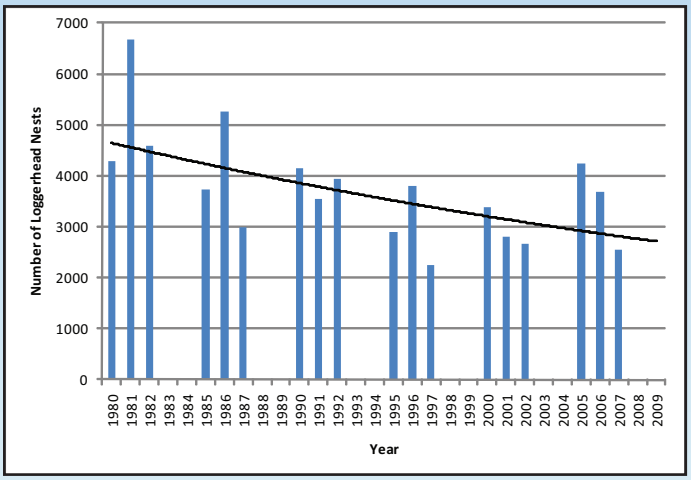

Figure 2. Loggerhead sea turtle nesting index, 1980 – 2007. Data were collected from fixed wing aircraft.

standardized management practices to monitor nests during the nesting season. South Carolina's sea turtle nest protection project participants include private citizens and individuals who belong to conservation organizations, federal, state or local agencies and universities. SCDNR trains and issues permits to participants to survey the beach to locate nests, relocate nests when necessary, protect the nests with predator-proof screen, monitor nests during incubation and inventory the nests after the hatchlings emerge to determine the hatch success. Since 1980, the number of nests under management has continued to increase (Figure 3). Approximately, 68% of the nesting effort in South Carolina is managed by nest protection efforts.

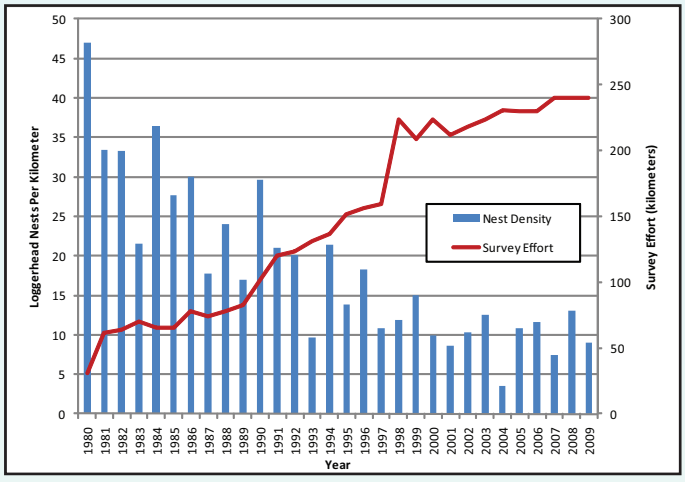

Figure 3. Number of loggerhead nests per kilometer reported by project beaches, 1980 – 2009. Data were collected during ground surveys. The divergence of the trends in this figure is due to the addition of low nesting density beaches over time.

The value of beach management is best expressed in terms of hatchling productivity. A summary of historical hatchling productivity with and without beach management (see Table 4 in Hopkins-Murphy and Seithel, 2005) reported 2,708,677 hatchlings produced with management versus 235,340 hatchlings without management. Hatchling productivity is 11.5 times greater with nest protection management in place.

SCDNR Sea Turtle Stranding and Salvage Network

The Sea Turtle Stranding and Salvage Network (STSSN) was established in 1980 to collect information on sea turtles that strand. Strandings provide important information about the population of sea turtles in the water (i.e., number of males versus females, number of adults versus juveniles, disease, human-induced mortality, etc.). The STSSN is part of a multi-regional network from the U.S. Gulf of Mexico and Atlantic coasts coordinated by the National Marine Fisheries Service (NMFS). Members of the network include many of the same individuals and entities involved in nest protection. Remote islands are surveyed monthly by SCDNR in fixed wing aircraft. Network members are trained to correctly identify species and to properly collect measurement data. Reports of unusual specimens are verified by the state STSSN coordinator. The mean number of sea turtle strandings per year from 2000 – 2009 was 122 (Figure 4).

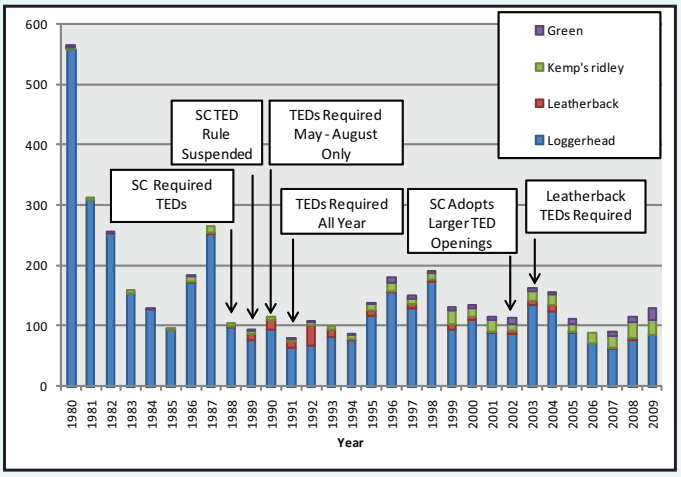

Figure 4. Sea turtle strandings by species, 1980 - 2009.

Sea turtle strandings can be also used to assess the effectiveness of TEDs (turtle excluder devices) which are large openings in the commercial trawl nets that allow a

sea turtle to escape. During the 1980s and 1990s, many of the sea turtle strandings were undoubtedly related to the commercial shrimp trawl fishery. South Carolina was the first state to enact TED regulations in 1988. In the spring of 1990, Decline of the Sea Turtles – Causes and Prevention was published by the National Research Council. They concluded that "for juveniles, sub-adults, and breeders in the coastal waters, the most important human-associated source of mortality is incidental capture in shrimp trawls, which accounts for more deaths than all other human activities combined" (National Research Council, 1990). Figure 4 provides a brief history of TED implementation.

Debilitated Turtle Syndrome, or DTS, is an unexplained condition that affects primarily juvenile loggerhead turtles and causes them to strand in an anemic, emaciated and dehydrated state. Typically, the turtle has a heavy barnacle load coupled with external and internal parasites (Figure 5). SCDNR data indicate that the percentage of loggerhead strandings in South Carolina exhibiting symptoms of DTS has been on the rise and has accounted for approximately 12.6% of total loggerhead strandings in the past ten years (Figure 6). Although the cause(s) of this condition are unknown, SCDNR and other institutions are researching possible explanations for DTS.

Figure 5. Juvenile loggerhead (Caretta caretta) sea turtle with debilitated turtle syndrome. External characteristics include an emaciated state and a heavy barnacle load, especially small to medium size barnacles on the soft tissue.

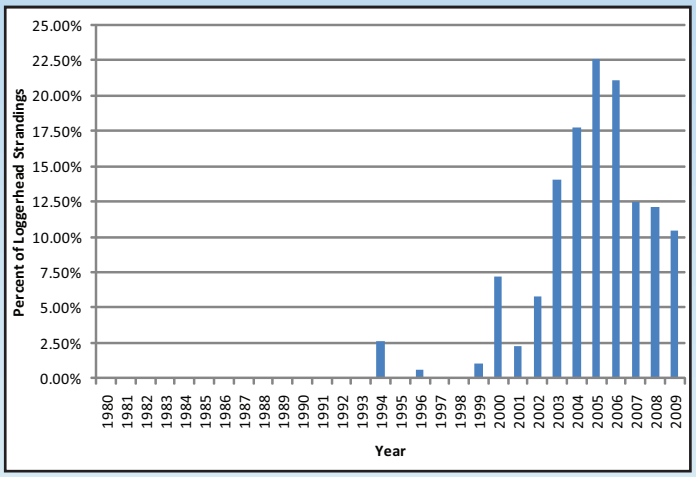

Figure 6. The percentage of loggerhead strandings that showed symptoms of debilitated turtle syndrome, 1980 – 2009.

SCDNR coordinates with the SCA to aid sick and injured sea turtles that strand alive on the South Carolina coast. Sea turtles face a number of threats in their marine habitat as mentioned above. Prior to 2000, sea turtles were transported to Florida or North Carolina for care. Since 2000, the SCDNR transports live sea turtles to the SCA. When a sick or injured sea turtle is admitted, it is rehabilitated until considered healthy enough to return to the ocean. Live strandings often do not survive transport from the beach to the rehabilitation facility. When a sea turtle strands, it is often very near death because it has lost the strength to prevent washing ashore. Therefore, only a small number of live sea turtle strandings actually survive and regain their health (Figure 7).

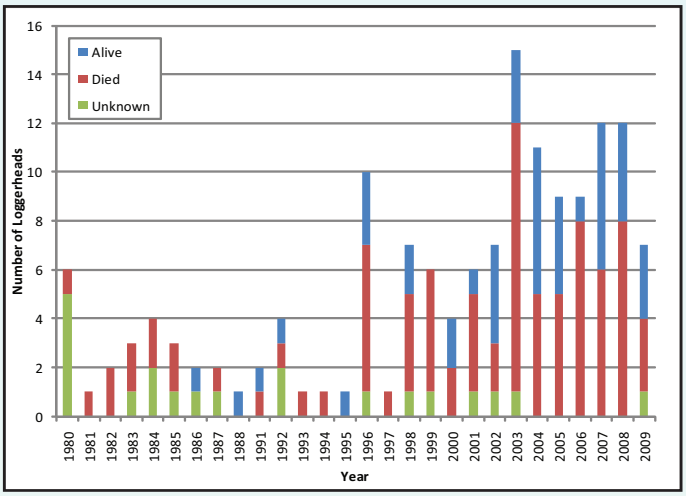

Figure 7. The number of live loggerhead strandings and their outcome, 1980 – 2009. Those labeled as unknown were not determined to be dead or alive because they were not collected or were allowed to return to the ocean.

SCDNR In-Water Study

During the 2000 – 2003, 2008 and 2009 summers, the SCDNR Marine Resources Division conducted extensive trawl surveys to document the relative abundance, composition and health of sea turtles in near shore waters from Winyah Bay, South Carolina, to St. Augustine, Florida. Modified shrimp nets (large mesh webbing without TEDs) sampled randomly selected areas with short tow times of 20 to 30 minutes in duration to prevent turtles from possibly drowning. Because sea turtles are long-lived, slow-growing and late-maturing, detecting recovery of the nesting population (adult females only) may take as many as thirty years. Thus, assessing the abundance of the in-water population provides a refined estimate of future nesting stocks and enables data collection on adult males and juvenile sea turtles that do not come ashore. Figure 8 reports the catch per unit effort for each year of the trawl survey.

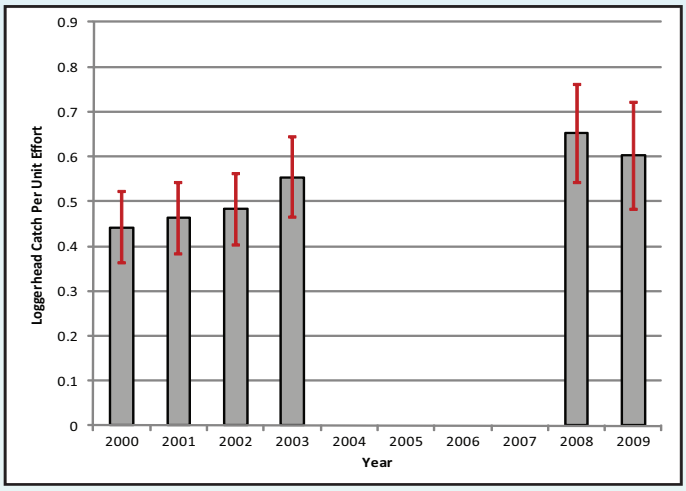

Figure 8. Loggerhead catch per unit effort during SCDNR in-water trawl surveys, 2000 – 2003, 2008 and 2009. Trawling in shipping channels was conducted in lieu of regional sampling between 2004 and 2007.

State of the Resource

The Loggerhead Biological Review Team reported in 2009 that the Northwest Atlantic Ocean Distinct Population Segment (which includes loggerheads nesting in SC, NC, GA and FL) is currently at risk of extinction. This risk is largely attributed to the mortality of juvenile and adult loggerheads from fishery bycatch in the North Atlantic Ocean (Conant et al., 2009). Nesting in South Carolina is declining 1.9% per year. While the implementation of TEDs has greatly reduced the impact of the commercial shrimp fishery on this resource, anthropogenic threats to juveniles and adults in the marine environment continue to present additional unsustainable mortalities. Sea turtle conservation has historically focused on protection on the nesting beaches. Maintaining this protection in the terrestrial environment is critical but protection for sea turtles in the marine environment is of utmost importance for their continued survival.

Literature Cited

Conant TA, Dutton PH, Eguchi T, Epperly SP, Fahy CC, Godfrey MH, MacPherson SL, Possardt EE, Schroeder BA, Seminoff JA, Snover ML, Uptite CM and Witherington BE. 2009. Loggerhead sea turtle (*Caretta caretta*) 2009 status review under the U.S Endangered Species Act. Report of the Biological Review Team to the National Marine Fisheries Service, August 2009. 222 pages

Hopkins-Murphy SR and Seithel J. 2005. Documenting the value of volunteer effort for sea turtle conservation in South Carolina. Chelonian Conservation Biology. 4: 930-943

National Marine Fisheries Service, United States Fish and Wildlife Service. 2007. Loggerhead sea turtle (*Caretta caretta*), 5-year review: summary and evaluation. NOAA NMFS, Washington, DC

National Marine Fisheries Service, United States Fish and Wildlife Service. 2008. Recovery plan for the Northwest Atlantic population of loggerhead sea turtle (*Caretta caretta*), second revision. National Marine Fisheries Service, Silver Spring, MD

National Research Council. 1990. Decline of the Sea Turtles: Causes and Prevention. National Academy Press, Washington, DC

Contributing authors:

DuBose Griffin
GriffinD@dnr.sc.gov

Arturo Herrera