

Diamondback Terrapin

Malaclemys terrapin

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DESCRIPTION

Taxonomy and Basic Description

The diamondback terrapin is a small, long-lived estuarine turtle endemic to coastal marshes, estuarine bays, lagoons and creeks ranging from Cape Cod, Massachusetts to the Gulf Coast of Texas. Currently, there are five (Hartsell 2001) or seven (Ernst et al. 1994) subspecies. More recently, Hart (2004) identified six management units. The subspecies found in South Carolina is *Malaclemys terrapin centrata*.



Terrapins have varied coloration from black to spotted patterns on the soft tissue and dark or light-colored scutes with strong concentric layers on the carapace. The hind margin of the carapace curls up instead of flaring. Hind legs are large and toes have extensive webs. These turtles are strong, fast swimmers that feed on a variety of mollusks, crustaceans and other invertebrates. In South Carolina, salt marsh periwinkles (*Littoraria irrorata*) and blue crabs (*Callinectes sapidus*) are among the terrapin's primary food sources (Tucker et al. 1995; Levesque 2000).



Terrapins are sexually dimorphic. Females are much larger than males and reach 15 to 18 cm (6 to 7 inches) in length; males reach 10 to 13 cm (4 to 5 inches) in length. Adult females also have enlarged heads. Terrapins hibernate in the mud during winter and mate in the spring. Eggs are laid May through early August and clutches have 5 to 12 eggs (Pritchard 1979). The number of clutches laid per female in South Carolina is undocumented; however two clutches may be common (David Owens, College of Charleston, pers. comm.).

Status

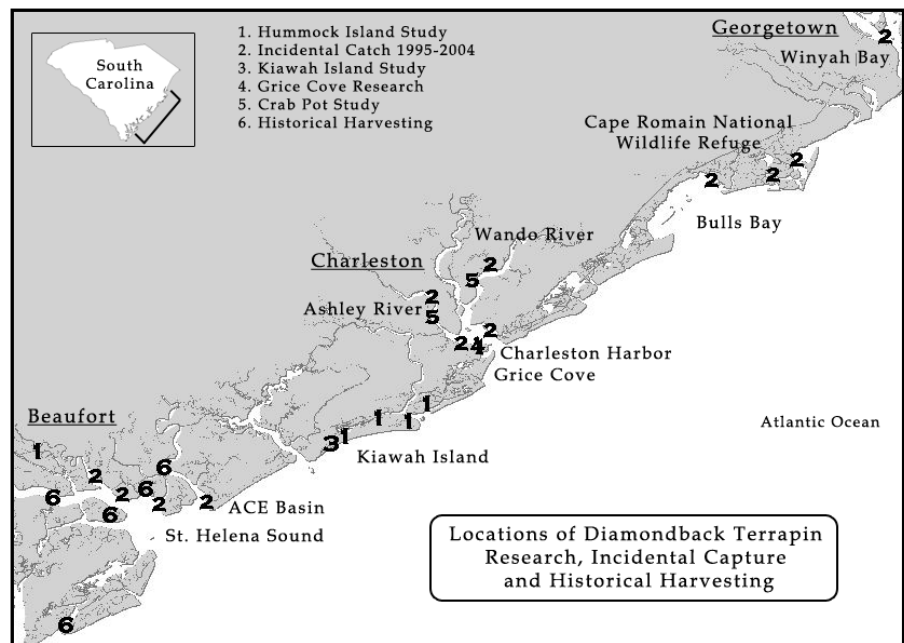
The 2003 International Union for Conservation of Nature and Natural Resources (IUCN) lists terrapins as a species of lower risk/near threatened. In South Carolina since 2000, Chapter 5 Section 50-5-2300 of South Carolina law "authorizes the Department of Natural Resources to grant permits for the harvest and marketing of diamondback terrapins." However, there have been no permit requests for harvesting terrapins. Currently, permit requests would be considered but not issued (D. Theiling, SCDNR, pers. comm.) because the species' status is unknown or declining (Seigel and Gibbons 1995). Prior to 2000, the law allowed a harvest season, but this has not been active since the 1970's (R. Gault, terrapin harvester, pers. comm.). The status of the

species is listed as unknown in South Carolina (S?) and apparently secure globally (G4) (NatureServe 2005).

POPULATION DISTRIBUTION AND SIZE

The current status of most populations of terrapins is unknown or declining (Seigel and Gibbons 1995). The species experienced near extinction in the early 1920's because of commercial over-harvest. Commercial harvest declined in the late 1920's and terrapin populations increased (Gibbons et al. 2001). Mr. Robert Gault, the last terrapin harvester in the state, reported catches of nearly 500 turtles in two to three days of net fishing in the Beaufort area in the 1970's.

Two decades of monitoring terrapins in four creeks adjacent to the Kiawah River has documented a decline since the early 1990s and local extirpation (Gibbons et al. 2001; Tucker et al. 2001). Along the South Carolina coast, incidental catch data from 1995 through 2004 of diamondback terrapins in research trammel nets has remained consistent. Incidental captures north and south of the Charleston Harbor estuary are much less common (Levesque 2000; B. Roumillat and J. Archambeau, SCDNR, pers. comm.).



Genetic studies in North and South Carolina indicate that terrapin populations from these states are not significantly different (Hart 2004; Hauswaldt 2004) and should be treated as one management unit. A previous genetic study using a different genetic marker was unable to detect a difference between the Carolinas and Georgia (Lamb and Avise 1992). The Diamondback Terrapin Working Group (DTWG) was formed in September 2004. Georgia and both Carolinas comprise the southeastern section of this working group.

It should be noted that in 1947, several thousand diamondback terrapins were released into Cape Romain National Wildlife Refuge (CRNWR) waters from the North Carolina Beaufort Fishery Station (Anonymous 1947). The genetic stock of these terrapins is not known. This should be taken into consideration when determining the genetic stock of diamondback terrapins in South Carolina waters.

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Terrapins are endemic to estuarine habitats. They are the only emydid turtle that can survive in a high salinity environment without accessing a freshwater source. Terrapins nest on land and require access to dry soft sand/soil to deposit their eggs. There is also evidence of high site fidelity and low recruitment and/or dispersal among tidal creeks. If a population were extirpated from a tidal creek, recruitment from other creeks would be very slow to repopulate the area. (Gibbons et al. 2001).

CHALLENGES

Major problem for diamondback terrapins include loss or degradation of nesting habitat resulting from coastal development. Nests are destroyed by native (raccoons and mink) and non-native predators (fire ants) as well as erosion and storm events. Vehicle inflicted mortality of females during the nesting season is common where a highway separates nesting sites from tidal creeks. Mortality is also associated with mowing of causeway shoulders (T. Murphy, SCDNR, pers. comm.).

A major source of mortality in the marine environment is the presence of recreational, commercial and abandoned/ghost crab pots. In the Ashley and Wando Rivers, Bishop (1983) estimated that the mean daily terrapin catch per baited crab pot was 0.16 in April and May with 10 percent mortality. A statewide survey in fall 2003 documented nearly 10,000 commercial hard crab pots (M. Maddox, SCDNR, pers. comm.). Other problems include commercial harvesting (if permitted), destruction of food resources, environmental degradation and contamination (through increased sedimentation, nutrient enrichment, oil spills and filling/draining marshes), boat and propeller mortality and the commercial pet trade (D. Owens, College of Charleston, pers. comm.).

CONSERVATION ACCOMPLISHMENTS

A Diamondback Terrapin Working Group (DTWG) for the species' entire range has been organized to facilitate information exchange and to set research and management priorities; this group was formed September 2004 (D. Griffin, SCDNR, pers. comm.). In 2000, the South Carolina legislature recognized the value of science-based management of marine resources and has changed commercial access to the South Carolina terrapin resource from a seasonally open fishery to one managed with discretion by the Department of Natural Resources (D. Theiling, SCDNR, pers comm.).

There have been local research findings and accomplishments throughout South Carolina. Sonic telemetry has been useful in studying site fidelity of terrapins. Genetic studies indicate that high site fidelity is not reflected in population genetic structure; no significant genetic differentiation exists among estuaries in North and South Carolina. Further, terrapins between South Carolina and New York are more similar to those from Texas than to terrapins in Florida, possibly because of intentional mixing (Hauswaldt 2004). Multiple paternity does occur in diamondback terrapins, but at lower frequencies than other species of turtles (Hauswaldt 2004). Genetic

management units are not estuary specific; therefore, terrapins within the units defined by Hart (2004) can be translocated to areas where terrapins are extirpated (Hauswaldt 2004).

Diamondback terrapin nesting was apparent on five of 16 hummock islands inventoried during a 2003 through 2004 South Carolina Department of Health and Environmental Control (SCDHEC)/SCDNR preliminary study in South Carolina (W. McCord, SCDNR, pers. comm.). Seasonal reproductive activity of Charleston Harbor estuary terrapin populations has been determined and may be used to reduce anthropogenic threats (Lee 2003). Grice Cove Beach in the Charleston Harbor estuary was identified as an important nesting beach for diamondback terrapins compared with other beaches in this system. Highest nesting activity was early May to mid June (Riollana 2003).

A terrapin population study in four tidal creeks adjacent to the Kiawah River has been ongoing since 1983. There have been 1,336 individual terrapins captured and 1,323 recaptures (Gibbons et al. 2001). Recreational crab pots have been shown to adversely affect diamondback terrapin populations in the Kiawah River (Hoyle and Gibbons 2000). From 1995 to 2004, terrapins have been consistently caught in research trammel nets (Levesque 2000; W. Roumillat and J. Archambeau, SCDNR, pers. comm.). Terrapins play an active role in the salt marsh food chain and are an important predator of salt marsh periwinkles, *L. irrorata* (Levesque 2000).

A diamondback terrapin spring mating aggregation has been identified in Grice Cove in the Charleston Harbor estuary (B. Estep and D. Owens, College of Charleston, pers. comm.). Baseline data on clutch and egg size was documented for Kiawah Island, South Carolina (Zimmerman 1989). Artificial propagation of the diamondback terrapin is a successful management strategy for this species (Hay 1917; Barney 1922; Hildebrand 1929).

Five hundred bycatch reduction devices (BRDs) were made available to Kiawah Island residents, visitors and merchants. BRDs were provided for both commercial and recreational crab pots in the vicinity of Kiawah Island, John's Island and Beaufort (Marilyn Blizard and Elizabeth King, Kiawah Island, pers. comm.). Crab pots with BRDs showed an increase in the number of legal crabs caught (Guillory and Prejean 1998). The Town of Kiawah Island also sponsored a "Save the Diamondback Terrapin" program. Numerous educational materials have also been printed and distributed (M. Blizard and E. King, pers. comm.).

CONSERVATION ACTIONS

- Develop and implement long-term coastwide standardized surveys to estimate the abundance and distribution of South Carolina's terrapin population.
- Quantify anthropogenic sources of terrapin mortality, with focus on life stage and sex specific mortality rates.
- Determine effectiveness of bycatch reduction devices on crab pots to exclude terrapins.
- Identify sites of significant or potential terrapin mortality from vehicles and mowers.
- Determine habitat of one and two-year-old juvenile terrapins.
- Establish several intensive studies to determine population parameters required for evaluating the status of diamondback terrapins, such as mortality rates and nesting effort/success.

- Identify and protect critical diamondback terrapin nesting habitats throughout the state, especially from beach disturbances by visitors, boaters and dogs during the nesting season.
- Develop predator control programs for critical diamondback terrapin nesting beaches.
- Identify and protect critical diamondback terrapin mating aggregations throughout the state.
- Consider the need for a moratorium on commercial harvest and possession of diamondback terrapins without a permit.
- Examine the potential benefits of requiring effective BRDs in recreational and commercial crab pots for reduction of diamondback terrapin mortality.
- Examine the potential benefits of requiring effective degradable panels or panel attachments in recreational and commercial crab pots to reduce diamondback terrapin mortality associated with abandoned crab pots.
- Develop an abandoned/ghost crab pot collection program with partners throughout the state to reduce terrapin mortality in these traps.
- Evaluate the need for changing the status of the terrapin from a harvestable game species to a species “in need of management” under the South Carolina Nongame and Endangered Species Conservation Act.
- Collaborate with the South Carolina Department of Transportation (SCDOT) to negotiate restrictions of causeway mowing during the terrapin nesting season.
- Encourage the salvage of eggs from road-killed female terrapins for an incubation and release program by local animal care groups.
- Educate the public about how they can help conserve the diamondback terrapin and specifically emphasize responsible actions when using crab pots. Produce education materials to be distributed coastwide.
- Erect crossing signs along roadways alerting motorists about crossing diamondback terrapins during the breeding season. Signs should be theft proof or removed each year at the end of the breeding season.
- Develop a South Carolina Department of Natural Resources web page on diamondback terrapins. Web site will enhance collaboration for the southeastern portion of the DTWG.
- Participate in and contribute to the DTWG by attending triennial meetings.
- Collaborate with institutions, partners and nongovernmental organizations on future research and management actions to protect the diamondback terrapin.

MEASURES OF SUCCESS

As results from current research and surveys are identified and analyzed, we will initiate projects to address specific needs that arise from these results, with the ultimate measure of success being to stabilize or increase populations of diamondback terrapins.

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