

Spiny Softshell (*Apalone spinifera*)

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Texas Spiny Softshell (*Apalone spinifera*). Photo by Erik Enderson.

The Texas Spiny Softshell is not native to Arizona; it was introduced into Arizona around the turn of the last century.

Softshells are a highly derived group of turtles with rounded, flattened carapaces covered with a leathery skin; a long, retractile neck; and webbed, paddlelike feet (Ernst et al., 1994). Of five species inhabiting the U.S. (two introduced), the Spiny Softshell (*Apalone spinifera*) inhabits Arizona. The generic name, *Apalone*, comes from the Greek word for soft or tender in reference to its shell. The Latin-derived *spinifera* means thorn or spine and refers to tubercles along the front edge of the carapace (Beltz, 2006). Six subspecies are currently recognized, with that in Arizona being the Texas Spiny Softshell (*A. s. emoryi*), named in honor of William Hensley Emory by Louis Agassiz (1857).

Texas Spiny Softshells have olive to tan-colored carapaces with a pale border. A pattern of white dots, most distinct in juveniles and males (Degenhardt et al., 1996), may be present on the carapace in contrast to the black ocelli (dark blotches) of some other subspecies. The reduced plastron leaves the rear legs and tail exposed and is immaculate white or yellow. The head and limbs are olive to gray with a pattern of dark spots and streaks, and a dark line connects the eyes. The tubular snout contains a small ridge extending from the septum - another characteristic, other than the texture of the carapace, that distinguishes this species from the Smooth Softshell (*A. mutica*). Adult males reach about 22 cm (8.7 in) in

carapace length, while females reach 54 cm (21.3 in; Webb, 1973; Ernst et al., 1994).

The Spiny Softshell has the widest distribution of the genus in North America, occurring over most of the eastern U.S. outside the Atlantic seaboard. The species ranges from New York and southeastern Canada (Quebec and Ontario) west to Montana, south to the Carolinas and Georgia, and southwest to New Mexico and northeastern Mexico

(Chihuahua, Coahuila, Nuevo León, and Tamaulipas; Webb, 1973). Spiny Softshells occur from sea level to about 1,580 m (5184 ft; Stebbins, 2003).

The Texas Spiny Softshell is not native to Arizona; it was introduced into Arizona around the turn of the last century, when it probably entered the upper Gila River after a dike containing stocked turtles and catfish was breached (Miller, 1946). The species now occurs throughout the Gila and Lower Colorado River systems (Brennan and Holycross, 2006). The Spiny Softshell is primarily a riverine species, relying especially on a soft substrate with aquatic vegetation, sandbars, and mudflats, and generally avoiding temporary water (Ernst et al., 1994; Stebbins, 2003). However, it is a habitat generalist relative to its congeners, often thriving in altered environments (Moll and Moll, 2004). In Arizona it occurs throughout the major slow-running rivers, irrigation ditches and canals, and permanent and urban lakes (Brennan and Holycross, 2006).

The Spiny Softshell is highly aquatic, spending most of its time in the water, either foraging, floating at the surface, or buried in the soft bottom with only its head and neck protruding. *Apalone spinifera* is capable of aquatic respiration when submerged, with oxygen uptake occurring through the cloaca and skin, but also facilitated by threadlike projections in the vascular lining of the mouth cavity (Bennett and Dawson, 1976; Ernst et al., 1994). Spiny Softshells also spend

much time basking, usually alone, on rocks, logs, floating debris, or the banks of its aquatic habitat. When basking on shore, they usually face the water, ready to make a rapid escape. Spiny Softshells are predominantly carnivorous, primarily eating insects and other invertebrates, but also fish, frogs, and carrion. They forage by probing their elongated snouts under stones and vegetation or by ambushing prey from their secretive positions nestled in the substrate (Ernst et al., 1994).

Like most aquatic turtles, their nests are preyed upon by mammals such as skunks (*Mephitis*) and raccoons (*Procyon lotor*); their young are eaten by fish, snakes, wading birds, and mammals; and the adults are taken by alligators (not as often in Arizona, however), bald eagles (G. Beatty, pers. comm.), and humans. Lying concealed within their aquatic substrate prevents them from being discovered by predators, but if captured they have generally bad dispositions and may bite and scratch savagely (Ernst et al., 1994). Platt and Brantley (1991) also reported that a female suddenly squirted blood about 15 cm (5.9 in) from both eyes in response to handling, although they were unable to induce the behavior subsequently.

Spiny Softshells may be active during all months in the southern part of their range, with mating occurring in spring. In late spring and summer, females lay one or two clutches of up to 39 eggs (trending lower toward the southwest; Fitch, 1985) in nests dug in sunny, sandy areas close to water. The eggs are relatively large at about 28 mm (1.1 in) in diameter, and Carr (1952) recounted Agassiz' (1857, 1:407) suspicion that they came from an as-of-then unidentified species:

"The first intimation I had of the existence of another species of Aspidonectes within the boundaries of the United States was from the sight of two eggs collected in Texas These eggs were so much larger than those of either of the three other species of the family which I then knew that I did not hesitate to consider them as derived from an unknown species. My supposition was very soon changed into certainty, after I had received from the Smithsonian Institution all the specimens of turtles collected in Texas during the operations of the Boundary Survey, under the command of Colonel Emory, among which were young and adult specimens of this species, collected in the Lower Rio Grande of Texas, near Brownsville."

Incubation lasts 2-3 months, depending on nest temperature (faster incubation under warmer temperatures), and the 30-40-mm (1.2-1.6 in) hatchlings emerge in late summer and fall (Ernst et al., 1994). Unlike most other turtles, the sex of *A. spinifera* is not determined by temperature. Sex ratios average 1:1 under a wide range of incubation temperatures (Bull and Vogt, 1979).

Although Spiny Softshells are not native to Arizona, they are now well established. Their impact on native wildlife, particularly native fish of precarious status, is unstudied. At least within their native range,

these turtles are among the most widely exploited species for private consumption in the United States due to the large female size and good-tasting meat (Moll and Moll, 2004). They may be collected year-round throughout Arizona (with some exceptions; refer to the amphibian and reptile regulations at www.azgfd.gov) with a fishing or combination license. Given their non-native origins, Spiny Softshells may be collected in unlimited numbers in the state, but may not be possessed alive.

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