

## RAYED CREEKSHELL

*Strophitus radiatus*

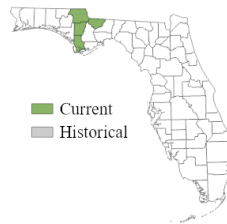
**Order:** Unionoida

**Family:** Unionidae

**FNAI Ranks:** G2G3/S1

**U.S. Status:** none

**FL Status:** none



**Description:** Formerly assigned to the genus *Anodontoidea*, the species was transferred to *Strophitus* and its concept reduced in 2018 by the removal of multiple populations into new species, including *S. williamsi* of the Choctawhatchee and Escambia river drainages (Smith et al. 2018). *Strophitus radiatus* is a medium-small bivalve mollusk known to reach a length of 84.6 mm (3.3 inches), although Florida specimens tend to be smaller, to 65 mm (2.6 inches). The shell is relatively thin, smooth, moderately inflated (width 30-40% of length), and oval to elliptical in shape (height 48-61% of length). The anterior margin is rounded, posterior margin narrowly rounded to bluntly pointed, dorsal margin straight to slightly convex, and ventral margin convex to broadly rounded. The posterior ridge is rounded and the posterior slope moderately low and flat to slightly convex. The broad umbo is slightly inflated and barely elevated above the hinge line; its umbo cavity is wide and very shallow. Umbo sculpture consists of thin to moderately thick ridges. Externally, the shell is shiny to dull and varies in color with age from yellowish green to dark olive, with dark green rays that vary in width and intensity; the inner lining of the valves (nacre) is an iridescent bluish white to white. Pseudocardinal teeth are small, thin, and low, with one in each valve; lateral teeth are absent (Deyrup and Franz 1994, Williams et al. 2008, Williams et al. 2014, Smith et al. 2018).

**Similar Species:** *Strophitus radiatus* resembles *Villosa vibex* (southern rainbow), but the latter has well-developed pseudocardinal and lateral teeth, which respectively are rudimentary and absent in the former. Co-occurring *Villosa* species have mottled mantle margin pigment whereas *S. radiatus* does not. Small *Pyganodon grandis* (giant floater) can also be similar but lack defined rays on the shell and are larger and more inflated than *S. radiatus*. *P. grandis* lacks pseudocardinal teeth and has umbo sculpture with knobby projections while *S.*

*radiatus* has sculpture with thin or medium loops (Williams et al. 2008, Williams et al. 2014). Not surprisingly, *S. radiatus* closely resembles its sister species *S. williamsi* (flatwoods creekshell; see separate account), although the two live in different drainages; *S. radiatus* tends to be less inflated (width 30-40% of length vs. 35-42%) and more elongate (height 48-61% of length vs. 52-64%) (Smith et al. 2018).

**Habitat:** The rayed creekshell is found in main river channels as well as tributary creeks; it typically occurs in slow to moderate currents on sand, sandy gravel, and sandy mud substrates.

**Seasonal Occurrence:** Adults are present in the substrate year-round. Females are long-term brooders and may be gravid much of the year (Williams et al. 2014).

**Florida Distribution:** Smith et al. (2018) restricted the Florida range of this species to the Apalachicola River system. It is extant in the Chipola River, where it is known from several sites on the river mainstem and a few tributaries (e.g., Marshall, Cowarts, and Dry creeks). Historically it occurred along the Apalachicola River mainstem and in at least one tributary (Mosquito Creek), but the current status of this population is questionable, with possible extirpation.

**Range-wide Distribution:** *S. radiatus* inhabits the upper Yazoo drainage in northern Mississippi, the Mobile drainage of eastern Mississippi and much of Alabama, and the Apalachicola drainage of southeastern Alabama, central Panhandle Florida, and western Georgia. Additional reports from the lower Mississippi and Big Black rivers in Mississippi remain unverified (Smith et al. 2018).

**Conservation Status:** Like most of Florida's native freshwater mussels, the rayed creekshell has declined throughout its range. Though still extant at several sites in the Chipola River system, the species has not been documented recently from the historic portion of its range in the Apalachicola River proper and may be extirpated there. The Upper Chipola River Water Management Area encompasses a portion of the river's floodplain, but more protection is needed in its middle and lower reaches. Even with such protection, mussel faunas are not immune to pollution from upstream sources or from the effects of invasive species such as the introduced Asian clam (*Corbicula fluminea*). Because of concern for the species, the U.S. Fish and Wildlife Service was petitioned by the Center for Biological Diversity and

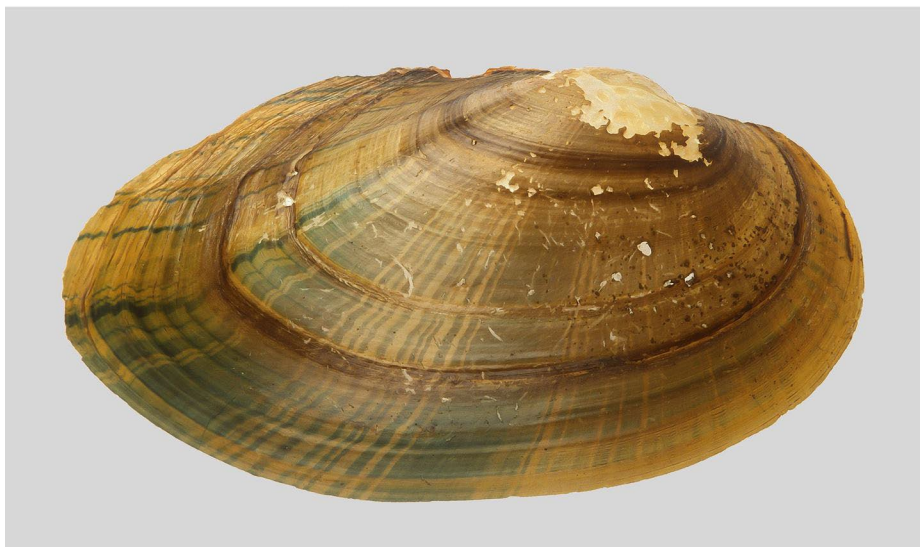
others in 2011 for federal listing (CBD 2011, USFWS 2011) prior to the 2018 splitting out of *S. williamsi* (and *S. pascagoulaensis*). Federal listing as Threatened for the current concept of *S. radiatus* may be appropriate.

**Protection and Management:** Additional protection via acquisition or easement is needed for the Chipola River floodplain and adjacent uplands that remain private, particularly in the river's middle and lower reaches. Managing for viable populations of freshwater mussels requires a focus on the maintenance of high-quality waters and benthic habitats, as well as ample stream and river flows (damming, dredging, and excessive water consumption are strongly discouraged); this requires coordination with Alabama, from which the Chipola's headwaters flow. Valuable tools include establishment of buffers and streamside management zones for all agricultural, silvicultural, mining, and developmental activities, and elimination or reduction of invasive species (especially other bivalves) if possible. Monitoring programs should focus on water and benthic habitat quality, and population size and status of both mussels and their host fishes (currently unknown for *S. radiatus*) at all occupied sites. Additionally, it is important to promote responsible watershed land use practices by implementing aquatic habitat education programs for land use planners and resource managers, and to conduct periodic reevaluations of the effectiveness of habitat protection measures and watershed land use practices.

**References:** Center for Biological Diversity 2011, Deyrup and Franz 1994, Smith et al. 2018, U.S. Fish and Wildlife Service 2011, Williams et al. 2008, Williams et al. 2014.



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