American Water Shrew

Sorex palustris (Richardson, 1858)

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CONTENT AND TAXONOMIC COMMENTS

Ten subspecies of the American water shrew (*Sorex palustris*) are recognized (van Zyll de Jong 1983). Only *S. p. punctulatus* is found in the region (Hooper 1942). The literature on the species was reviewed by Beneski and Stinson (1987).

DISTINGUISHING CHARACTERISTICS

The American water shrew is a large, long-tailed soricid with a long, pointed snout. Its measurements are: total length, 130–156 mm; tail, 58–71 mm; hind foot, 18–20 mm; weight, 8–18 g. The dental formula of the American water shrew is: I 3/1, C 1/1, P 3/1, M 3/3 = 32 (Figure 1). The eyes and ears are small and concealed in the pelage. The pelage color is dark grayish-brown to black dorsally and light gray below, and can appear iridescent. The tail is distinctly bicolored, dark above and light below. Additionally, the hind feet of American water shrews are broad and fringed with stiff hairs. These characteristics make it unlikely that the water shrew would be confused with any other long-tailed shrew. Junge and Hoffman (1981) provide descriptive details. See keys for additional details.

CONSERVATION STATUS

The American water shrew has a global rank of Secure (NatureServe 2007). It is considered Imperiled in North Carolina and Tennessee, and Critically Imperiled in Georgia and Virginia. It is unranked in South Carolina. The Virginia Department of Conservation and Recreation lists *S. p. punctulatus* as Endangered. Kennedy and Harvey (1980), Linzey (1984, 1998), Webster (1987), Pagels and Handley (1991), and Laerm et al. (1995, 1999) provide substantive comments on the regional status of the species.

DISTRIBUTION

The American water shrew is associated closely with the Canadian and Hudsonian Life Zones. It is distributed throughout the boreal forest from Nova Scotia to Alaska and south through the Sierra Nevadas and Rockies in the West, and the Appalachians south to Tennessee, North Carolina, and Georgia in the east (Figure 2). It is restricted to the Blue Ridge and portions of the northern Ridge and Valley in a series of

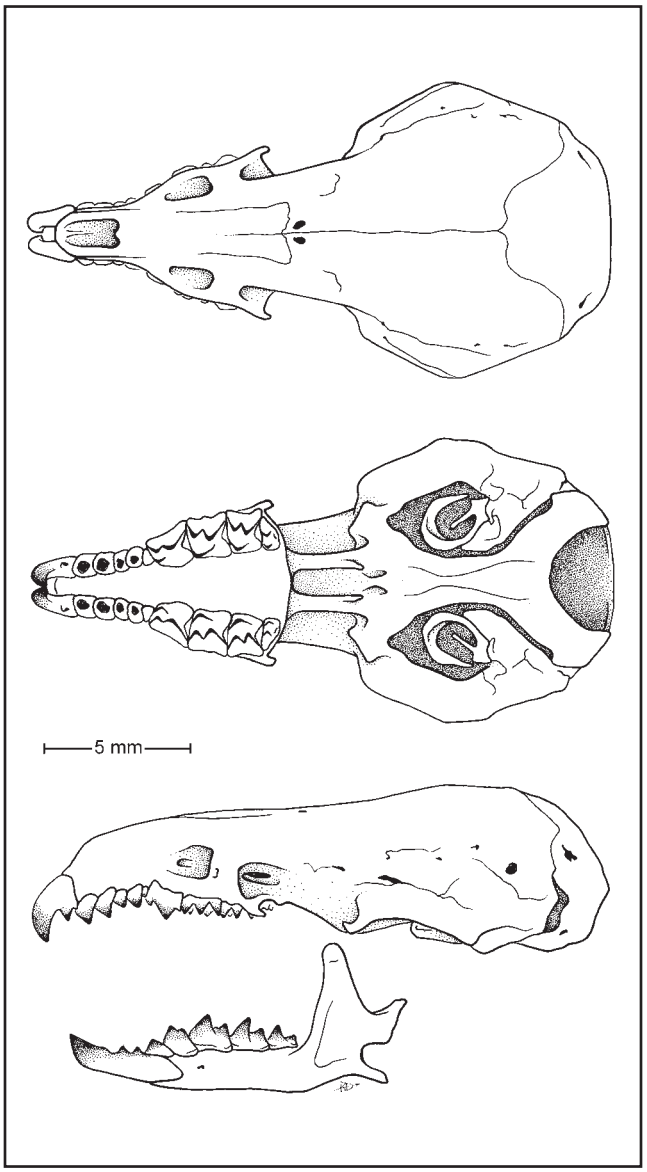

Figure 1. Dorsal, ventral, and lateral view of cranium and lateral view of mandible of *Sorex palustris* from Robinson Portage, Northwest Territory, Canada (USNM 107043, female).

apparently disjunct populations in Virginia (Pagels and Handley 1991, Linzey 1998, Pagels et al. 1998), Tennessee (Conaway and Pfitzer 1952, Kennedy and Harvey 1980, Linzey 1984, Harvey et al. 1991), North Carolina (Whitaker et al. 1975, Lee et al. 1982, Webster 1987, Laerm et al. 1999), and Georgia (Laerm et al.

1995). However, there is too little information available to adequately determine distribution extent or confirm the apparent disjunct nature of its populations.

ABUNDANCE STATUS

Collection records and existing literature indicate that the American water shrew may be extremely rare, although in Macon County, North Carolina, Laerm et al. (1999) recovered 10 individuals in 1,000 pitfall trapnights in three high elevation (> 1,300 m) first order streams. Because water shrews are very difficult to catch, it is possible that this species may be more widely distributed than present documentation suggests.

PRIMARY HABITAT

Beneski and Stinson (1987) reviewed the ecology and habitat associations of the American water shrew throughout its range. Hooper (1942), Conaway and Pfitzer (1952), Pagels and Tate (1976), Pagels and Handley (1991), Laerm et al. (1995, 1999), Pagels et al. (1998) and Ford et al. (2006) comment on habitat associations in the southern Appalachians. The American water shrew is found in association with high gradient, first and second order montane streams or seeps at high elevations where abundant cover from overhangs, rocks, roots, logs, and crevices exists (Pagels et al. 1998). In the Allegheny Mountains of West Virginia and Maryland, this species can occur in boggy habitats with little tree cover. In the southern Appalachians, the species is associated with riparian areas at medium to high elevation (900–1,800 m) in red spruce–Fraser fir (*Picea rubens-Abies fraseri*), northern hardwood, cove hardwood, and white pine–eastern hemlock (*Pinus strobus-Tsuga canadensis*) cover types, typically with dense rhododendron (*Rhododendron maximum*) understories. The American water shrew apparently has echolocation capabilities useful for orientation within the cluttered microenvironment where it exists (Buchler 1976).

REPRODUCTION

Conaway (1952) and Beneski and Stinson (1987) reviewed the information on reproduction of the American water shrew. Two or three litters with 4–7 young are produced annually. Gestation and lactation periods are not known, although they probably are similar to other shrews (approximately 21 days in most *Sorex*). Males and females usually are not active reproductively until they overwinter. The maximum life span is approximately 18 months.

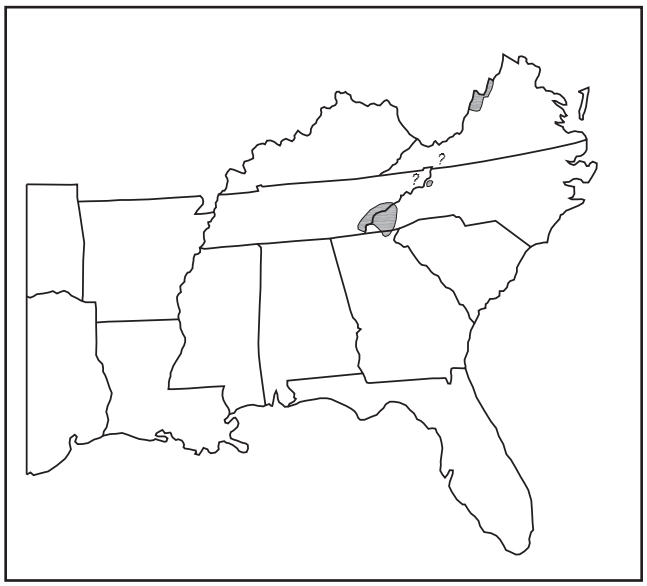

Figure 2. Distribution of *Sorex palustris* in the South.

FOOD HABITS

The food habits of the American water shrew were summarized by Beneski and Stinson (1987). This species primarily is insectivorous, feeding on both terrestrial and aquatic invertebrates such as larval plecoptera, ephemerida, and trioptera (Linzey and Linzey 1973). It may also feed on fish and larval salamanders, but these items constitute a small component of the diet (Conaway 1952).

ASSOCIATED SPECIES

The American water shrew is associated with other high elevation forest insectivores in the southern Appalachians such as the northern short-tailed shrew (*Blarina brevicauda*), masked shrew (*S. cinereus*), smoky shrew (*S. fumeus*), and the hairy-tailed mole (*Parascalops breweri)*. Rodents that occupy habitats associated with the water shrew include the deer mouse (*Peromyscus maniculatus*), southern red-backed vole (*Clethrionomys gapperi*), southern bog lemming (*Synaptomys cooperi*), and woodland jumping mouse (*Napaeozapus insignis*).

VULNERABILITY AND THREATS

Pagels and Handley (1991) suggest that the existing populations of the American water shrew in the southern and central Appalachians are Pleistocene relicts and populations have been small and scattered for most of the recent past. Water shrew distributions from Pennsylvania south may have been contracting for thousands of years in response to climate-driven

habitat changes, and this may be further accelerated by human-induced global climate change. Past land use practices in headwater streams used by this species probably have extirpated local populations, creating additional population fragmentation. Habitat degradation from logging, agriculture, and road construction negatively impact the riparian habitats favored by the American water shrew (Pagels et al. 1998).

MANAGEMENT SUGGESTIONS

Ford and Rodrigue (2001) suggest that streamside management zones with effective Best Management Practices are critical around riparian areas where American water shrews occur. Management impacts to water quality should be minimized or avoided. Additional surveys to adequately document American water shrew presence are needed in the southern Appalachians.

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